

BUYING POWER OF LABOR AND POST-WAR CYCLES

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INTRODUCTION

ALTHOUGH there has been a considerable literature centering about the proposition that cyclical changes are due chiefly to the inability of the mass of workers to buy back the products of their labor, statistical data of a substantial character have generally been lacking. And while the many intangibles which the modern student of that complex of phenomena known as "business cycles" must face, are conducive to hesitancy in asking for conclusive evidence for theories that have been so often propounded and had such marked influence in some quarters, nevertheless it remains true, that the strength of such hypotheses is proportional to the factual weight behind them. Whatever the causes for the distinct lag between this fertility in theorizing and the providing of the statistical props may be, the fact remains that in this country indices of employment, wages and production, on a basis of short-time intervals, have been forthcoming only since the war. It is precisely because of this comparative abundance of information that we have restricted this study to the post-war period.

Yet it would be folly to claim finality for a test confined to experience in this period. Not only because the two cycles, the first beginning in the spring of 1919 and ending in the middle of 1921, and the second starting in August 1921 and ending in July 1924, were distinctly individual in character (the first showing changes of unusual magnitude and the other changes on a much smaller scale) but primarily because we are dealing with only *two* cases of cyclical phenomena.

This study is confined chiefly to factory labor. But is this restriction not fatal to an examination of the broader issues stated above? If the part that changes in the wage-earner's income plays in business fluctuations in a given period, is to be traced, we must remember that factory labor receives about one-third of the wages and salaries disbursed (average 1909-18)¹ and that the net value of production of manufacturing establishments is about one-fourth of the total net value of the product of all industries. It is something more than the practical exigencies of available information that makes this study chiefly one of workers in manufacturing establishments. In the first place, there seems to be no prior consideration that would lead us to believe that the conclusions drawn from these data would of necessity be inapplicable to other than factory workers—it is likely at the most to be a difference of degree rather than kind. And if a difference of kind exists, it is important to establish that fact. But above all, cyclical fluctuations stand in most impressive relief when they reflect the movements of factory operations. Then, after having explored this information in detail, we will be in a position to see to what extent the data concerning wages in other industries, square with the first results.

A cursory examination of Chapter I will reveal that the main reliance for information on buying power, is the pay-rolls disbursed by factory establishments. The tables and charts remind one of Professor Berridge's prize essay published in the volume called "Purchasing Power of the Consumer". Despite the saving of time and energy, as well as the cost of printers' bills, which would result from the use of Professor Berridge's essay as a basis of discussion, it was thought advisable to use more "refined" methods in making the indices.

¹ *National Bureau of Economic Research, Income in the United States*, vol. ii, p. 242.

In his study, Professor Berridge was concerned chiefly with the construction of satisfactory indices for registering changes in incomes of factory workers.¹ My aim is to use such indices for cyclical comparisons. Here more refined methods are useful. Some industries showed a distinct trend upwards in wage disbursements, others revealed a downward tendency. Then too, the seasonal variations play an important role in many of the industries. It was thought best to eliminate these secular and seasonal factors before making a comparison of the time-movements as well as the range of cyclical fluctuations in factory workers' incomes. It was also desired to know the force of the immediate factors affecting the changing wage bills of these industries, in particular the part that employment played—whether it is true that employment, as Professor Berridge has suggested, precedes the buying power of these workers by about three months.² Since the Federal Reserve Board supplied the corresponding indices of employment, there was ample opportunity for such a test. Furthermore, by comparing the standard deviations of employment and payroll series, we would have an additional test of the role employment played in the variations of the wage bill, and perhaps further light might thereby be thrown upon the changes in wage rates and time worked. For these reasons then, the more elaborate technique was thought appropriate for our purpose. We should not fail to add, that the Federal Reserve Board furnished data for a more inclusive list of branches of industry than that given in Professor Berridge's study.

¹ Professor Berridge has had a hand in making the figures we have used: for he and Mr. Woodlief Thomas have constructed the indices of payrolls and employment for the Federal Reserve Board.

² *Purchasing Power of the Consumer*, p. 48 and his *Cycles of Unemployment in the U. S.*, pp. 70, 71.

Why this preoccupation with time sequences and magnitudes of change? If light is to be obtained on the fluctuations of purchasing power, the time when the different groups of workers began to show greater or lesser capacity for buying the products of the labor of other groups of workers, and the strength of the influence of the changes in each group, should be ascertained. Furthermore, most of these industries stand in a pivotal position for reflecting the activity of groups of industries other than manufacturing establishments. In this way it should be possible to feel the pulse of wider circles of consumers' incomes. Most of these questions will be discussed in the first chapter.

The second chapter will seek to express the money incomes of workers in terms of cost-of-living indices. It will also present some of the problems connected with the formation of localized cost-of-living series for the purpose of deflating the payrolls of the major groups of industries. We will then be in a position to compare indices of volume of output with the purchasing power series.

The third chapter will present a comparison of the fluctuations of payrolls in the eleven major groups of industry with newly constructed indices of pecuniary volume of production. In particular, critical examination of the current use of such series, and of the extent to which valid inductions can be drawn from such data, will be made. Incidentally, indices of labor cost based on the ratios of payrolls to production will be given, to see how these workers' incomes look from the angle of the enterprises disbursing these sums. For the repercussion of such disbursements may be quite different in their effect when going into the pockets of workers as compared with the effect they have upon the enterprises which are paying out these sums. An index which seeks to indicate how these payrolls appear in terms of cost to the enterprise may be helpful.

In the final chapter a brief comparison and estimate of the purchasing power not only of factory workers, but of other branches of occupations will be made. This comparison will be followed by a discussion of the events of the past seven years in the light of the pertinent theories of business cycles.

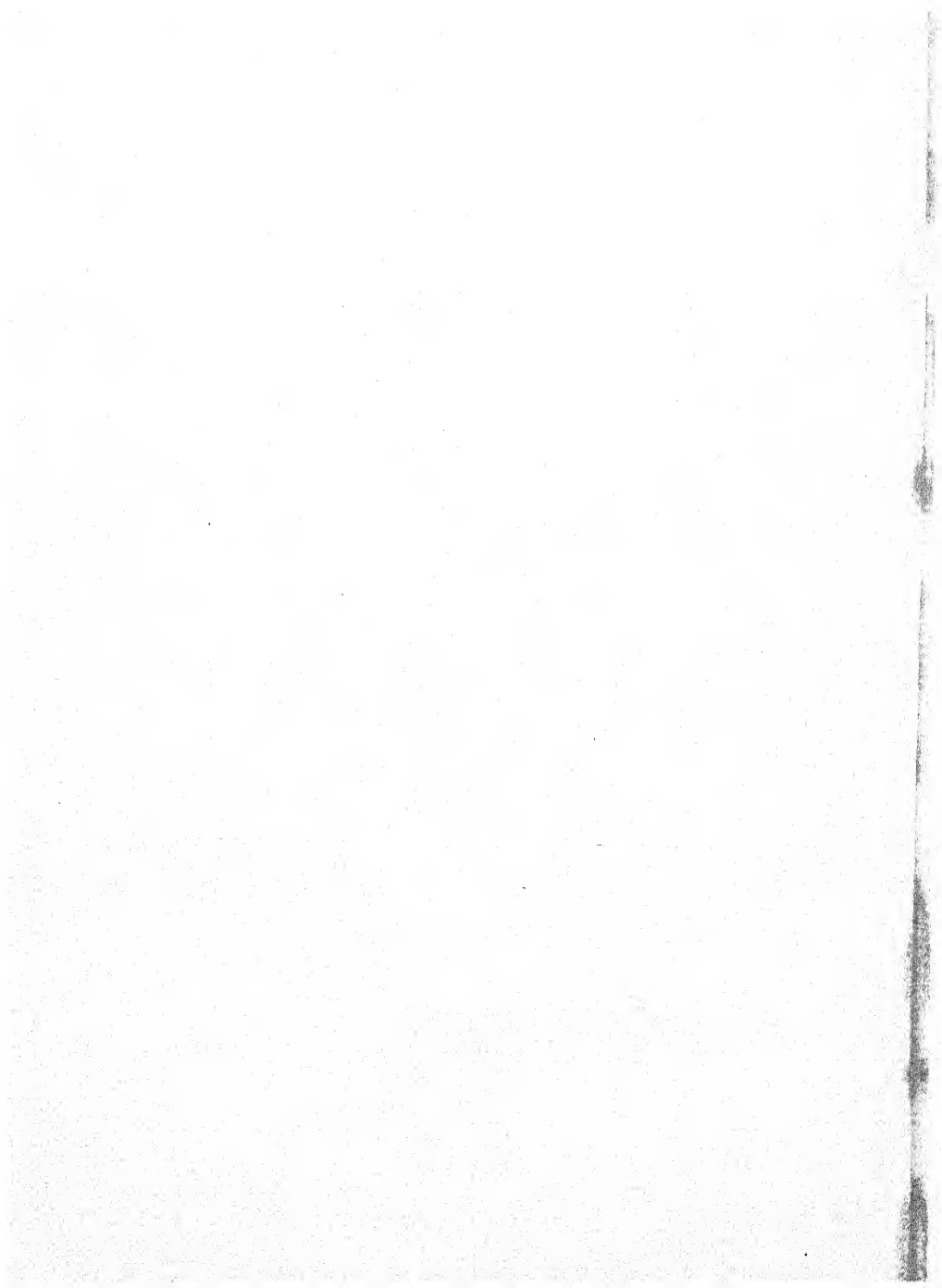


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CHAPTER I

CYCLICAL FLUCTUATIONS OF PAYROLLS IN MANUFACTURING ESTABLISHMENTS IN THE UNITED STATES, 1919-1925

FOR the purpose of the present study, the best collection of statistical information on the money incomes of workers in manufacturing establishments, is that furnished by the Federal Reserve Board in its monthly publication, the Federal Reserve Bulletin. Indices of payrolls began to be published in the May 1925 issue. These cover eleven major groups of industries. As originally constructed, however, the index of payrolls included 33 different branches of industry. The figures for the sub-groups were supplied to the writer by the courtesy of the Board's Director of the Division of Research and Statistics—Dr. Walter W. Stewart.

If we are to examine the magnitude of the cyclical changes in the monetary receipts of wage earners in different industries as well as the time-order of their fluctuating payrolls, we must employ the familiar technique of the student of business cycles, namely, the elimination of secular trends and seasonal elements that may have entered into the data. Where so-called long-time trends were apparent, the method of least squares was used to fit a straight line to the series; where no trend appeared the index was expressed in terms of the average of the period 1919-1925. Seasonal indices, calculated by the method of link-relatives were subtracted from the ratios of the original figures to the secular trends or the average of the period to get the so-called cyclical changes. More will be said later on with regard to the

legitimacy of the procedure. For the present let us turn to the results.

We may compare the changes in payrolls from two points of view: (1) their relationship from the point of view of precedence, or time-order; (2) the duration and magnitude of the cyclical fluctuations.

The following tables give the indices of payrolls, corrected for secular trend and seasonal variations, in the various branches of the Metals Group.

TABLE 1. PAYROLLS IRON AND STEEL (CRUDE AND INTERMEDIATE)
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	133	127	91	45	96	110	114
February	118	131	82	46	96	117	110
March	109	140	71	50	99	118	111
April	107	137	61	61	106	122	114
May	97	135	59	66	116	111	113
June	101	147	51	75	122	94	107
July	108	142	44	74	115	87	106
August	120	139	42	75	117	89	104
September	116	146	39	79	114	90	101
October	80	153	49	91	122	101	
November	96	146	53	99	118	103	
December	115	123	54	100	111	112	

TABLE 2. PAYROLLS MACHINERY
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	99	130	100	56	99	108	100
February	95	123	83	58	104	109	104
March	93	135	79	61	110	109	105
April	92	133	75	64	117	109	105
May	89	135	70	68	121	104	107
June	87	140	65	74	124	101	107
July	91	144	61	76	124	93	106
August	101	143	61	81	122	93	108
September	111	139	59	86	122	95	107
October	113	129	55	89	122	97	
November	122	123	56	94	120	97	
December	127	114	56	100	118	100	

CHART 1

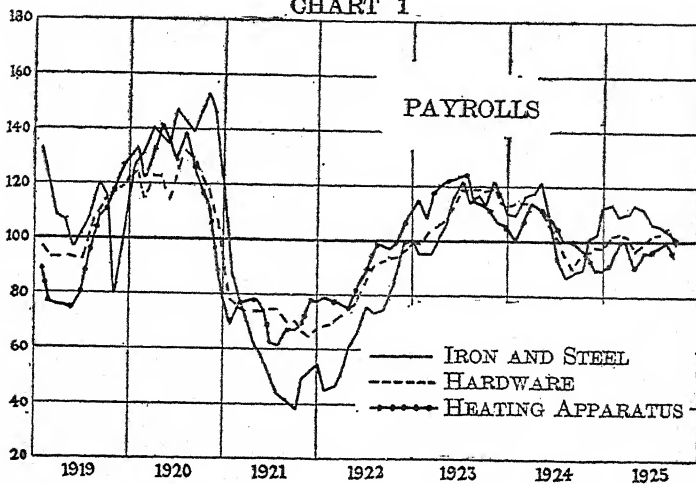
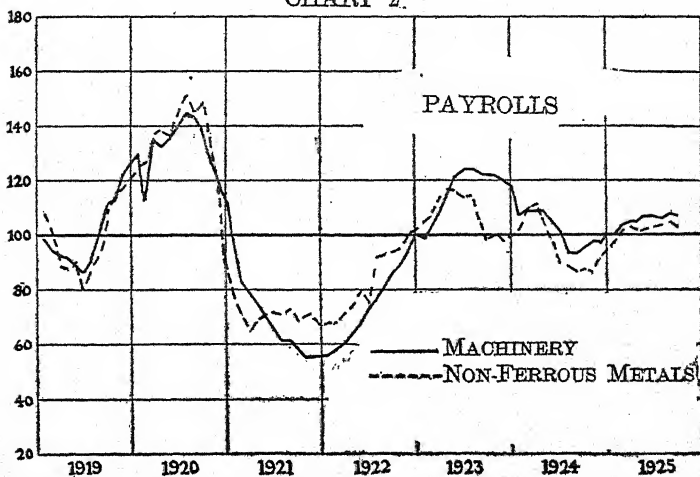


CHART 2.



BUYING POWER OF LABOR

TABLE 3. PAYROLLS HARDWARE

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	97	124	78	69	99	114	102
February	93	115	75	70	103	114	103
March	93	123	74	73	105	114	102
April	93	123	74	75	107	112	96
May	93	114	74	78	112	107	100
June	92	126	75	86	119	102	101
July	104	132	75	91	119	95	103
August	110	129	70	92	119	90	105
September	115	124	71	94	118	94	99
October	116	119	67	94	119	96	
November	119	107	65	97	114	98	
December	122	95	68	100	113	98	

TABLE 4. PAYROLLS HEATING APPARATUS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	89	133	69	79	115	100	93
February	76	122	77	78	109	108	100
March	75	130	77	76	118	113	100
April	75	142	78	75	121	112	90
May	74	137	75	84	123	110	96
June	80	129	62	88	124	106	96
July	96	139	61	100	125	100	98
August	109	129	67	99	115	100	100
September	111	121	67	97	114	99	94
October	120	113	69	99	112	97	
November	126	93	78	108	107	89	
December	129	78	77	112	106	89	

TABLE 5. PAYROLLS NON-FERROUS METALS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	108	126	78	68	105	102	97
February	100	127	71	68	107	111	102
March	89	138	65	71	114	112	103
April	88	139	68	74	117	106	101
May	91	137	71	80	117	99	102
June	80	146	72	75	114	90	103
July	90	152	71	92	115	89	104
August	93	146	73	93	105	87	105
September	112	149	68	94	99	88	103
October	116	138	70	95	100	87	
November	118	121	71	100	98	92	
December	121	89	67	101	100	95	

METALS AND PRODUCTS

This group ranks first, whether measured in terms of numbers employed or wages distributed. A two-fold subdivision is made consisting of Iron and Steel Products and Non-Ferrous Metals. The relative importance of each subdivision is indicated by the fact that a weight of 2 is given to the Non-Ferrous group and of 26 to Iron and Steel products. The largest single industry as measured by employment or payrolls is Machinery; the second in order is the manufacture of "Crude" Iron and Steel, followed by Heating Apparatus and then Hardware. These four make up the sub-group, Iron and Steel Products. A brief introduction to the character of each branch is in order. We shall limit ourselves to only one aspect, i. e., the character of the demand for the product.

The bulk of pig-iron produced is consumed in the manufacture of steel. The chief consumers of finished steel are the railroads, building industry, automobiles, the oil, gas and water industries, agricultural equipment, machinery and hand tools. The demand for the products of the machinery group ranges over a widely diversified field. The highly

specialized machinery which modern industry requires is furnished by the plants which are classified under this group. Complementary to these products of the foundry and machine shop and playing an important part in the industry is the production of machine tools including the various parts and attachments requisite for machinery. The hardware industry furnishes supplies chiefly for buildings, motor vehicles, railways, furniture and leather industries. Heating apparatus supplies steam-heating and hot-water boilers, radiators, valves, stoves, ranges, and furnaces of various kinds.

An examination of the figures and the corresponding charts, will show that there were two cycles in the movement of wages of the workers in the metals group. Does further examination reveal a consistent time-order relationship in the movement of payrolls? More specifically, does this relationship follow the logic of the basic character of the industry, i. e., the more primary the point of manufacture, the more sensitive the reaction of the monetary receipts of the workers in that branch? If not, is there any other time-order connection?

Of the four branches of the Iron and Steel group, Iron and Steel crude and intermediate, is the most basic in character. The payrolls in this branch preceded any of the other branches, with the exception of Heating Apparatus, on the upward movement, but they lagged behind on the downward swing. Machinery and Hardware, so far as timing was concerned, behaved almost alike. They started to rise about two months after Iron and Steel, but began to recede about two months earlier. The figures for employment, however, show that Hardware is more sensitive to the timing of cyclical changes than Machinery. The most consistently individual in character is Heating Apparatus. It was the most sensitive in its movements; it preceded the others from one to

three months. This is even more evident if comparison is made between the indices of employment.

It would seem that the proposition that the more primary the nature of the branch of industry the earlier is its response to cyclical changes, is not supported by the facts, at least so far as the Iron and Steel group is concerned in the post-war years. There was, however, a consistent relationship between the two major branches which together include ninety per cent of the workers attached to the metals group, namely, Iron and Steel (crude and intermediate) and Machinery. The former preceded the latter by about two months on the upward swing, and lagged behind by about two months on the downward swing. It is to be expected that when general business conditions improve to the extent that they warrant an increase in demand for the products of the iron and steel group, production of iron and steel in its less differentiated form will increase sooner than the production of machinery and machine tools, assuming of course that stocks play an insignificant role. This is a technological necessity. The fact that payrolls in Machinery tended to sag to a lower level sooner than Iron and Steel, is more difficult to explain. Perhaps it takes longer to catch up with current orders in the latter industry than in the former. Moreover, the greater dependence of the steel producers on the demand of the railroads which continues to maintain its activity longer than industrial enterprises, may partially account for the difference. Then, too, it may be that contracts for future delivery which were entered into before recession began but which were executed afterwards, kept employment and payrolls at their peak several months longer in the case of iron and steel than machinery. So far as the behaviour of Hardware and Heating Apparatus is concerned, we may add that it is likely that these two branches fall in line more directly with the building industry than do the others. A great deal of the

uncertainty of this discussion would be removed, if more specific information were available with regard to the nature of the sample that was used in the construction of these indices.

Let us now compare the duration of the cycles. The first cycle of the Iron and Steel group was one-half year shorter than the second. Machinery, Iron and Steel, and Hardware ranged 27-29 months for the first and 33-34 months for the second. Once more, Heating Apparatus was individual in character. It was shortest in the first cycle and one-half year longer in the second.

What about the magnitude of fluctuations? Here, too, we find considerable differences among the different branches in the same cycle and even sharper relative differences of these same branches in the two cycles. When we compare the percentage change of payrolls from peak to trough in the first cycle, we find that the greatest range of fluctuation was shown by Iron and Steel (153 to 39) and the lowest by Heating Apparatus (142 to 61) a 74.5% decline in the first case, and 43% decline in the second. A variation of 32% existed among the different branches in the first cycle, and only 4% in the second. It is therefore obvious that the relative differences of the same branches in the two periods are marked. The amount of payrolls distributed from 1919-21 fluctuated 2.6 times as widely as it did in the period 1921-24 in Iron and Steel; 2.4 times for Machinery; 2 times for Hardware, and 1.2 times for Heating Apparatus. For the period as a whole, however, the best measure of the "average amplitude of the fluctuations of the cyclical movements" is indicated by the standard deviation. The standard deviations of the payrolls are as follows: Iron and Steel 28.3; Machinery 23.3; Hardware 17.4; and Heating Apparatus 20.1.

The payrolls of the Non-Ferrous group showed several distinct characteristics. First, they reached the lowest point of depression in 1921 from 4 to 8 months sooner than any of the branches of the Iron and Steel group. Secondly, they kept their lowest point for a year and then began to rise. They reached the peak of the second cycle about two months sooner than any of the others. This probably indicates that the workers enjoyed a relatively shorter period of improvement. The wide amplitude of fluctuation is indicated by a standard deviation of 21.5.

TEXTILES AND PRODUCTS

TABLE 6. PAYROLLS COTTON GOODS MANUFACTURING
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	79	120	73	98	110	114	105
February	63	116	91	94	110	113	106
March	66	122	91	76	115	106	108
April	73	122	91	75	118	100	108
May	85	122	92	79	126	93	105
June	97	137	94	80	121	86	98
July	104	142	97	84	115	80	95
August	103	142	95	89	116	84	95
September	100	131	95	93	116	85	79
October	102	108	95	98	114	98	
November	97	95	96	109	113	95	
December	113	75	96	104	113	100	

TABLE 7. PAYROLLS WOOLEN GOODS MANUFACTURING
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	72	143	57	96	116	106	108
February	44	139	71	99	115	109	105
March	55	140	86	91	115	103	97
April	77	138	101	90	111	92	92
May	83	134	103	90	116	84	84
June	104	113	109	93	116	79	82
July	116	69	109	98	114	78	85
August	118	65	108	98	109	85	84
September	118	80	108	102	108	90	80
October	118	80	106	103	117	105	
November	119	72	104	113	112	105	
December	134	57	103	112	107	106	

TABLE 8. PAYROLLS SILK MANUFACTURING
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	99	124	84	99	99	104	104
February	85	120	88	91	99	105	105
March	85	122	94	93	99	97	105
April	96	122	99	75	101	96	105
May	99	122	100	71	104	89	105
June	98	123	104	76	107	92	105
July	100	112	104	83	105	86	111
August	103	109	98	83	104	93	113
September	96	102	97	84	105	94	106
October	99	101	96	88	104	99	
November	114	95	92	97	106	99	
December	121	92	97	98	104	102	

An examination of the charts in this group as compared with Metals, will reveal several differences: firstly, payrolls in Textiles recovered 3 to 5 months sooner from the post-war reaction; secondly, they reached the ensuing depression 6 to 9 months earlier, and finally they were on the road to recovery before metals.

The fact that employment and payrolls began to go upward after the trough of January 1921, introduces uncertainty in measuring the number and the durations of the cycles. This temporary spurt continued for about a year in Cotton manufacturing and six months in Woolens and Silks. Whether we date the second cycle from the trough of 1921 or from the second low point of depression which ensued after this temporary period of recovery, makes little difference, if we keep in mind that compared to the preceding and succeeding periods of recovery this one was on a comparatively low level. Measured from January 1921, the second cycle lasted 42 months, measured from the spring of 1922, it lasted 25 months. The duration of the first cycle was 23 months counting January, 1921, as the trough.

CHART 3

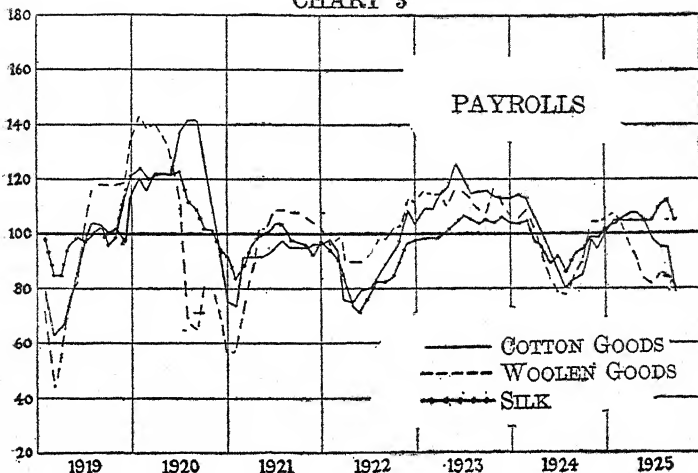
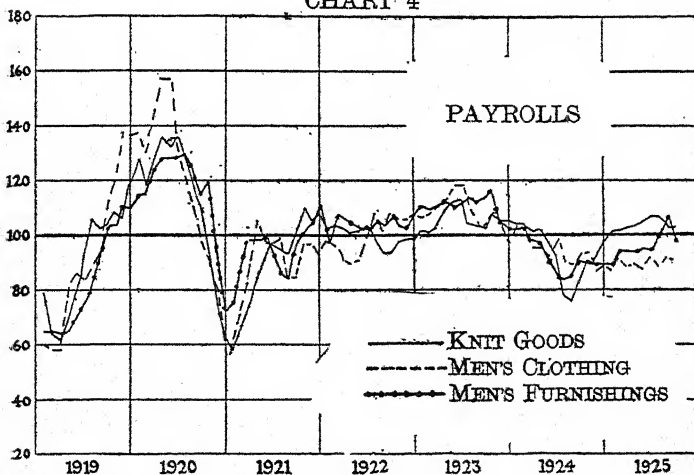


CHART 4



The money incomes of workers showed the widest range of fluctuation in Woolens and narrowest in Silks in the first cycle. The percentage change from peak to trough was 59.4% in the first case and 42.2% in the second. In both cycles, payrolls of Silks were notable for the relatively narrow range of their variation from the so-called "normal line." This is further attested by the standard deviations which were 19.7 for Woolens, 15.3 for Cottons, and 10.9 for Silks. How can we account for these differences in fluctuations?

One interesting point arises in this connection when we compare the respective standard deviations of the corresponding employment figures. They were: Cotton 8.5, Wool 16.1, and Silks 6.5. Apparently, the chief immediate factor in the lower variability of Cotton payrolls as compared with the payrolls of Woolens, is the fact that employment in Cotton manufacturing varied half as much as employment in Woolens. On the other hand, wage cuts seem to have been more frequent in Cottons. What was this due to? Then again, why was employment in Silks the most stable of the three industries?

It is difficult to ascertain the particular factors that have made for these differences. The best that we can do is to rule out some elements that may appear plausible. It should be recalled that the standard deviations do not measure cyclical changes only; they are considerably influenced by so-called "irregular fluctuations". One of the most important of these "irregular changes" in the textile industry is the occurrence of strikes. But there is no evidence that the occurrence of strikes affected any one of these branches more than the others. We can also rule out as one of the factors, differences in strength of labor organization, for the workers in these three branches are equally unorganized, or rather, weakly organized. It is possible that the relatively

TABLE 9. PAYROLLS TEXTILE PRODUCTS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	72	127	76	96	106	105	95
February	67	123	88	102	106	104	98
March	67	128	93	99	106	95	95
April	76	131	101	96	108	96	93
May	80	131	98	97	111	94	96
June	86	124	98	98	111	92	96
July	98	115	98	100	106	83	97
August	103	109	103	100	103	85	97
September	110	104	104	100	100	90	92
October	107	104	100	101	105	92	
November	117	90	99	102	103	90	
December	121	77	100	102	100	95	

TABLE 10. PAYROLLS KNIT GOODS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	79	128	58	103	102	105	101
February	64	118	67	104	101	105	102
March	62	128	74	103	103	102	103
April	67	136	85	101	110	103	104
May	77	133	91	101	113	97	106
June	93	136	97	104	114	93	107
July	106	128	95	99	105	78	107
August	103	114	94	94	100	76	103
September	105	109	103	94	103	84	103
October	109	89	110	98	108	91	
November	107	71	106	99	106	92	
December	118	63	108	99	106	98	

smaller size of silk establishments, when unit of size is the average number of workers in a given establishment, made for smaller fluctuations in employment than was the case with the comparatively large plants of the other branches. But then, the average size of woolen establishments was smaller than cottons, and employment in woollens showed greater variations. It is likely that the differences in the

TABLE II. PAYROLLS MEN'S CLOTHING

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	60	138	57	98	107	104	88
February	58	131	71	96	109	103	92
March	58	143	84	92	112	96	89
April	81	158	106	90	114	96	90
May	86	158	98	91	119	93	88
June	84	138	97	100	119	98	92
July	89	120	99	106	110	91	89
August	95	110	85	102	104	90	92
September	114	101	85	106	105	94	91
October	120	98	97	104	109	94	
November	138	80	97	104	104	87	
December	137	56	93	106	98	89	

TABLE 12. PAYROLLS MEN'S FURNISHINGS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	65	116	75	102	112	103	90
February	65	116	92	108	110	103	95
March	64	123	99	107	111	99	95
April	65	128	99	105	113	98	95
May	70	128	100	103	111	91	96
June	75	128	93	103	112	87	95
July	82	129	86	106	115	84	100
August	94	122	85	104	113	85	107
September	104	115	98	107	114	91	97
October	104	120	102	104	117	90	
November	112	94	105	103	106	90	
December	111	72	111	107	103	90	

sizes of the standard deviations given above, may be best explained, when we examine the changes in the prices of raw materials used by these branches of industry, as well as changes in the character of the demand for their respective products.

TABLE 13. PAYROLLS WOMEN'S CLOTHING

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	71	111	104	72	105	102	98
February	67	116	107	103	102	100	99
March	77	120	117	108	108	97	101
April	82	108	109	98	106	101	98
May	81	110	110	100	106	98	99
June	90	111	110	99	106	94	100
July	107	101	101	96	100	74	103
August	114	104	106	99	99	91	100
September	117	101	106	103	89	99	96
October	100	119	92	102	103	96	
November	106	115	85	104	98	92	
December	115	112	84	99	98	103	

TABLE 14. PAYROLLS WOMEN'S HEADWEAR

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	83	118	95	97	102	101	97
February	88	111	118	96	100	100	98
March	91	109	118	103	106	92	97
April	81	107	119	107	106	90	94
May	91	110	99	102	108	96	100
June	91	113	110	100	108	93	99
July	98	102	93	97	108	98	99
August	100	93	95	98	108	89	96
September	98	103	95	102	104	96	90
October	91	106	95	103	104	92	
November	100	103	97	103	104	97	
December	104	101	99	103	104	97	

An examination of the indices of the Textile Products group shows at once that two of the series are highly erratic, namely, Women's Clothing and Women's Headwear. They are both conspicuous for the vagaries of their short-time movements and for the absence of cyclical changes, although these are faintly discernible in the payrolls of women's headwear. These two industries which cater to the wants of women and are notorious for their dependence upon the

whims of fashion and the fickleness of taste, need no comment on our part. Let us turn to Knit Goods, Men's Clothing and Men's Furnishings.

We now have another opportunity of testing the proposition discussed in the section on Metals, namely, whether there is a tendency for payrolls to act more promptly, the nearer the industry is to the source of raw materials. We have here two groups, one furnishing the fabrics and raw materials for the consumption of the other, with the consequent production of what are called textile products. The timing of the major movements of the payrolls in these two groups as revealed by a comparison of the index of Fabrics and Materials with the index of Textile Products, is identical. This seems to destroy any hypothesis of the dependence of precedence in movement of payrolls upon the primary or secondary character of the industry, in the cycles under consideration.

But may not this relationship hold with regard to the amplitude of fluctuations? In the metals group, when the respective standard deviations were ranked in descending order of magnitude, they corresponded exactly with the payrolls of these branches grouped according to nearness to the primary source of materials, namely, iron and steel. Was this the case in textiles? A comparison of the standard deviations of the index of Fabrics and Materials with that of the index of Textile Products, furnishes little support for this relationship. The figures are 13.9 for the former and 12.8 for the latter. The standard deviations for employment indicate the same thing, 9.1 for the former and 8.0 for the latter. More specifically, the amplitude of fluctuations of payrolls for Woolen Manufacturing is identical with that of Men's Clothing, and Cotton Manufacturing is very close to that of Knit Goods and Men's Furnishings. Nor do the employment figures show any difference.

<i>Standard Deviations</i>	<i>Payrolls</i>	<i>Employment</i>
Cotton	15.3	8.5
Woolens	19.7	16.1
Silks	10.9	6.5
Knit goods	16.0	11.9
Men's clothing	19.8	11.3
Men's furninshing	14.9	

One point stands out: employment was much more stable than the money income of the workers in the clothing industry. This would seem to indicate that either changes in time worked or changes in wage rates played a more important role in the manufacture of clothing than in any other branch of the textile industry.

So far as the Textile Products Group as a whole goes, we find that the variations of the percentage change from peak to trough was 20.3% in the first cycle and 6.4% in the second cycle. The duration of the first cycle was about one-half the second, 22 months and 43 months respectively.

LUMBER AND PRODUCTS

TABLE 15. PAYROLLS SAWMILLS AND PLANING

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	87	136	84	78	96	105	100
February	83	132	82	80	96	108	103
March	82	139	82	84	100	109	104
April	87	130	79	84	105	110	105
May	92	127	75	86	108	108	105
June	96	123	76	88	109	104	105
July	105	120	70	90	112	101	106
August	106	127	76	93	110	100	104
September	110	121	70	92	110	101	106
October	110	117	66	93	111	103	
November	118	106	65	93	112	100	
December	123	99	68	92	110	102	

BUYING POWER OF LABOR

TABLE 16. PAYROLLS FURNITURE

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	85	120	79	91	109	103	104
February	79	110	81	90	106	105	103
March	78	115	80	89	104	100	100
April	87	121	89	95	112	105	101
May	92	122	89	97	113	101	100
June	92	132	93	101	115	100	100
July	97	132	86	98	114	94	97
August	101	126	86	97	109	96	100
September	102	122	85	95	107	97	99
October	101	115	81	94	106	98	
November	103	100	82	99	102	96	
December	107	93	86	103	100	100	

TABLE 17. PAYROLLS MUSICAL INSTRUMENTS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	99	115	73	89	102	123	108
February	101	121	71	84	104	125	94
March	102	129	75	85	105	116	89
April	110	136	74	86	112	113	85
May	103	137	74	85	112	106	88
June	110	139	75	82	113	104	90
July	112	133	62	76	107	98	81
August	120	135	65	83	108	109	91
September	118	132	76	84	119	115	109
October	52	124	81	91	121	117	
November	52	108	78	93	123	122	
December	70	97	87	95	122	123	

The Federal Reserve Board Index for this group, is subdivided into Sawmills and Planing with a weight of 7.0; Furniture, weight 2.0 and Musical Instruments, weight 1.0. We have here articles which are illustrative of different stages of manufacture as well as differences in the character of the demand. What we find is that fluctuations of employment and payrolls are greatest in Musical Instruments and least in furniture. So far as changes in the two cycles go,

CHART 5

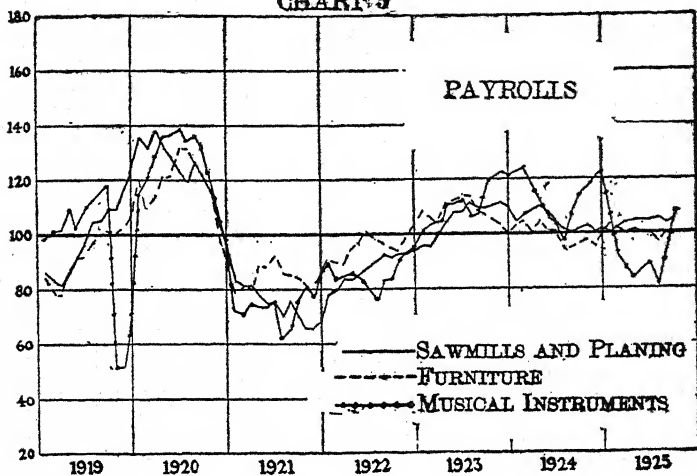
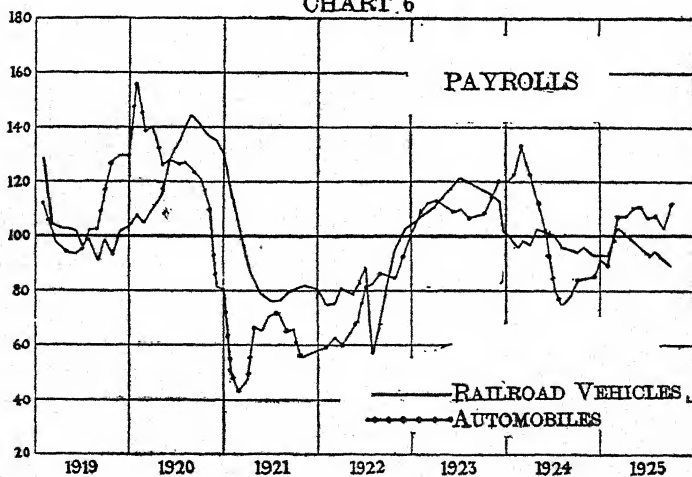


CHART 6



we find that measuring the range of fluctuations from peak to trough, the wage bill fluctuated 5 times as widely in 1920-21 as it did in 1923-24 for Sawmills; twice in Furniture and $1\frac{1}{2}$ - $2\frac{1}{2}$ times in Musical Instruments. Compared to the others, the last group is surely to be classed with "luxuries", although Furniture, to a large extent, may not be far removed from this category. When we consider Sawmills and Furniture, the amplitude of the cycles in the former was greater than in the latter—16.5 and 11.8 respectively.

With regard to timing, the following relationship is to be found. Payrolls of Musical Instruments began to rise first, the earliest of any employment or payroll series yet recorded to recover after the war. It receded about the same time as Furniture. It started its upward movement in the second cycle about two months before Furniture, but lagged behind the latter by seven months on the downward grade and in 1923-24 kept a higher level. Although the payrolls of Sawmills and Planing and Furniture started upward at the same time in 1919, the former preceded the latter on the downward grade of the first cycle by about four months; but in the second cycle, the former seemed to lag behind the latter by about the same number of months.

RAILROAD VEHICLES

In the first cycle, the payrolls of workers engaged in the production of Railroad Vehicles, lagged 2-3 months behind the movement of payrolls in the Iron and Steel Group. The amplitude of fluctuations was less as well as the percentage change from peak to trough in the both periods. The duration of the first cycle was 22-29 months; in the second 34-41 months. The cyclical variations of employment and payrolls in Railroad Vehicles, as indicated by their standard deviations, showed less difference than those in the Iron and Steel

industry, probably indicating a greater regularity in time worked as well as less frequent wage cuts in the former.

TABLE 18. PAYROLLS RAILROAD VEHICLES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	129	107	114	75	107	96	94
February	105	105	99	76	106	99	103
March	103	111	89	81	111	97	101
April	103	115	82	79	114	103	99
May	102	127	79	84	118	101	96
June	96	132	77	89	121	100	93
July	99	124	77	57	120	96	94
August	91	144	80	68	119	95	91
September	99	141	81	87	117	94	89
October	93	137	82	95	116	96	
November	102	135	82	103	113	93	
December	103	130	80	104	102	93	

AUTOMOBILES

The payrolls of the workers in the Automobile industry showed a steep upward trend which was exceeded only by two other industries. Its payrolls preceded Iron and Steel on the downward movement of 1920 and the upward movement of 1921 by about six months. It was the second industry in the amplitude of its fluctuations—the standard deviation being 24.7. It was also the second in the percentage decline from peak to trough in the first cycle and in the second cycle it was one of the largest (exceeding iron and steel) in range from the peak of February 1924 to the trough of July 1924, although the duration of the decline was one-half that of Iron and Steel. It also showed the speediest recovery in 1924-25. The duration of the first cycle was about one-half the second—21 months and 41 months. The use of a parabolic trend rather than a straight-line trend would not have changed the above results.

BUYING POWER OF LABOR

TABLE 19. PAYROLLS AUTOMOBILES

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	113	157	53	59	110	123	98
February	105	139	44	63	112	134	108
March	98	140	48	60	113	123	108
April	94	127	67	65	112	112	111
May	94	129	66	69	109	93	112
June	96	127	71	81	110	81	107
July	103	128	73	83	107	75	108
August	103	124	66	87	107	79	103
September	119	121	66	86	108	85	112
October	128	111	56	85	114	85	
November	130	82	57	92	120	86	
December	130	81	58	100	120	94	

PAPER AND PRINTING

In the index of total payrolls of the United States, Paper and Printing is given a weight of 8.0. The largest branch is Printing and Publishing with a weight of 5.5. The other branch, an industry more basic in character, is Paper and Pulp with a weight of 2.0. The outstanding fact in this group is the relatively even character of the distribution of payrolls in the Printing and Publishing industry, *i. e.*, the lack of cyclical fluctuations from 1921-25. Its standard deviation was one of the lowest and even in the first cycle we find that the percentage decline from peak to trough was 19.1%, the lowest of any series in the first cycle. The standard deviation of employment in Printing and Publishing was also the lowest recorded. It is very likely that the strongly organized union has had much to do with the outstanding stability in wage income. Undoubtedly, the relatively even character of the newspaper business is an equally important factor.

There is no distinguishable difference between the timing of payrolls in the Paper and Pulp industry and the Printing

and Publishing industry, but there is a difference of distinct character in the amplitudes of fluctuations, the former being twice that of the latter. The cuts in wages and changes in time worked as indicated by the comparative differences of their standard deviations of employment and payrolls, played a more important part in the more primary of the two industries.

TABLE 20. PAYROLLS PAPER AND PULP
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	90	113	110	85	97	99	101
February	85	111	106	85	99	103	103
March	82	119	100	83	103	103	105
April	81	121	93	81	108	103	105
May	74	138	77	86	112	103	104
June	89	140	78	86	112	98	100
July	93	140	81	87	108	93	100
August	94	144	80	86	102	92	97
September	101	144	81	91	102	97	96
October	104	142	80	93	98	99	
November	105	138	86	95	98	99	
December	109	122	85	94	99	100	

TABLE 21. PAYROLLS PRINTING AND PUBLISHING
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	80	110	105	94	99	101	99
February	84	111	101	93	101	103	100
March	85	114	101	98	102	102	100
April	88	111	98	98	103	104	100
May	89	112	94	98	103	103	100
June	91	112	98	99	102	102	100
July	93	112	98	98	102	100	100
August	97	114	99	101	100	100	101
September	98	112	98	100	100	100	99
October	73	115	97	99	101	100	
November	77	114	95	99	101	99	
December	102	106	94	97	99	97	

CHART 7

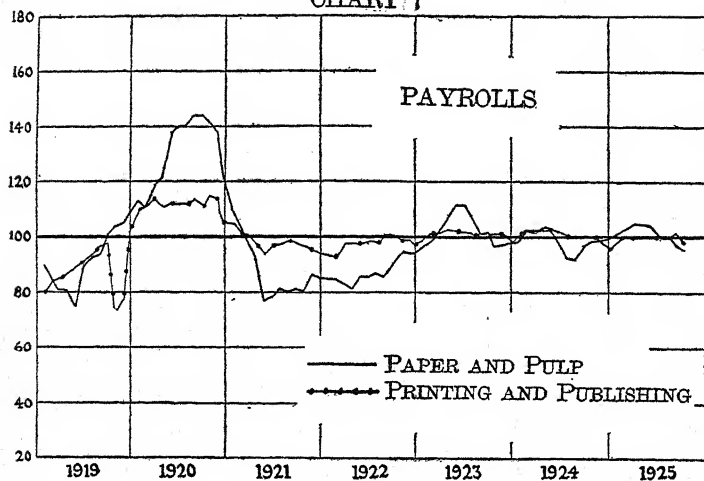
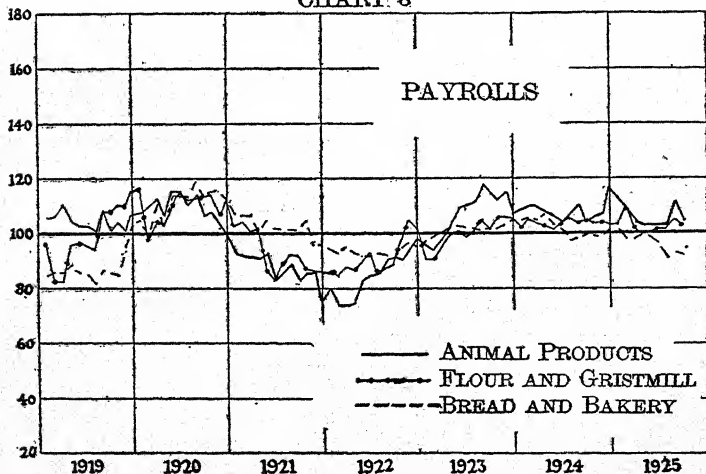


CHART 8



FOOD AND PRODUCTS

This group, which is given a weight of 7.5, is subdivided into the following branches: Animal Products (wt. 3.0); Flour and Gristmill products (wt. 0.7); Bread and Bakery products (wt. 2.6); and Confectionery and Ice cream (wt. 1.2). The chief characteristic of these branches is the comparatively narrow range of their cyclical fluctuations.

TABLE 22. PAYROLLS ANIMAL PRODUCTS
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	106	108	93	80	96	108	111
February	107	110	92	74	94	110	108
March	111	113	92	74	98	110	104
April	105	107	91	75	103	108	102
May	103	116	93	83	110	107	102
June	103	116	83	85	111	104	102
July	101	111	86	86	112	106	102
August	109	114	89	91	118	110	111
September	101	107	83	92	115	106	104
October	104	108	86	91	113	104	
November	101	102	86	95	115	106	
December	107	99	76	98	108	116	

TABLE 23. PAYROLLS FLOUR AND GRISTMILL
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	97	117	103	86	91	102	103
February	83	98	104	85	91	105	109
March	83	105	100	88	95	104	102
April	96	103	102	87	99	103	100
May	97	111	87	91	100	101	100
June	96	115	83	93	99	103	101
July	95	112	89	86	101	105	101
August	108	113	92	88	105	104	104
September	109	114	92	89	102	107	102
October	111	114	87	98	106	104	
November	110	107	86	105	106	104	
December	116	112	86	102	105	103	

BUYING POWER OF LABOR

TABLE 24. PAYROLLS BREAD AND BAKERY

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	85	105	108	94	97	105	101
February	86	99	107	93	99	106	98
March	86	111	107	95	100	105	98
April	89	103	100	93	102	107	100
May	86	114	105	92	103	103	99
June	85	114	102	92	102	101	96
July	82	114	101	93	102	97	91
August	87	119	102	92	101	98	93
September	86	114	101	91	102	100	92
October	85	115	105	95	102	99	
November	94	115	96	97	103	99	
December	103	112	96	95	105	101	

TABLE 25. PAYROLLS CONFECTIONERY

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	89	107	83	91	111	110	106
February	92	99	90	96	106	108	107
March	92	104	91	101	111	107	106
April	94	106	91	94	106	110	105
May	85	108	90	94	106	105	108
June	83	109	89	93	111	111	115
July	86	105	82	91	111	111	110
August	88	102	85	101	103	109	111
September	96	98	93	100	105	110	107
October	92	94	101	103	110	104	
November	101	93	91	112	112	93	
December	103	81	99	108	103	96	

The earliest to recover from the war period were the payrolls of flour and gristmill products. They were also the earliest to reach the peak of prosperity in 1920. They reached the trough of depression about 6 months before bread and bakery products. Flour and gristmill also showed greater sensitiveness to cyclical changes, but the amplitudes of fluctuation of both series were very similar. The payrolls of animal products showed the widest amplitude of any mem-

ber of the group. Confectionery payrolls were the first to reach the trough of depression in 1921, at least one year before any of the other Food and Products group. Almost throughout the last three years the payrolls of this branch reached and maintained a higher level than at any time during the previous three years.

LEATHER AND PRODUCTS

This group consists of two branches: Leather and Tanning (wt. 1.0) and Boots and Shoes (wt. 3.0). Although Leather and Tanning preceded Boots and Shoes in the first cycle, the reverse was the situation in the second cycle. In its behavior from January 1921 Boots and Shoes reminds one of the Textile Group. In Leather and Tanning, employment preceded payrolls by 1 to 2 months; in Boots and Shoes both series acted simultaneously in their changes. Then too, Leather and Tanning showed a wider amplitude of fluctuations—standard deviations were 15.1 and 9.1 respectively.

TABLE 26. PAYROLLS LEATHER TANNING
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	89	133	73	88	104	106	105
February	90	127	71	90	107	105	108
March	91	128	71	82	107	103	107
April	96	127	69	84	110	102	103
May	100	128	72	84	112	96	104
June	107	128	82	91	112	96	104
July	113	126	85	94	111	92	103
August	121	119	84	95	107	93	105
September	119	102	83	96	107	96	105
October	121	100	79	98	108	99	
November	122	92	78	103	108	100	
December	127	82	86	103	104	103	

CHART 9

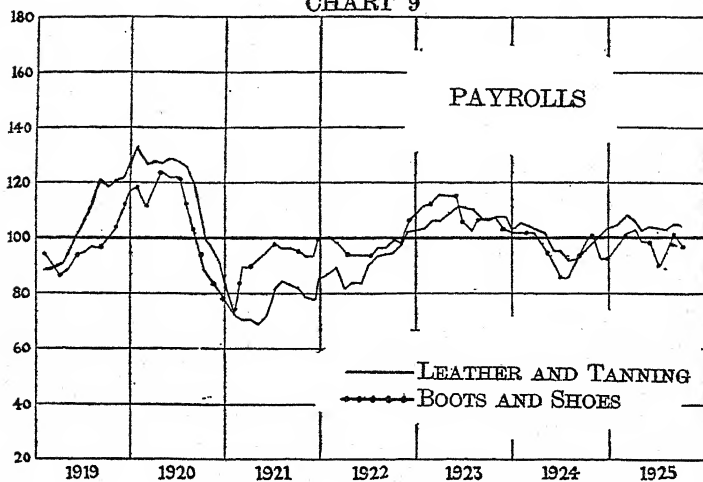


CHART 10

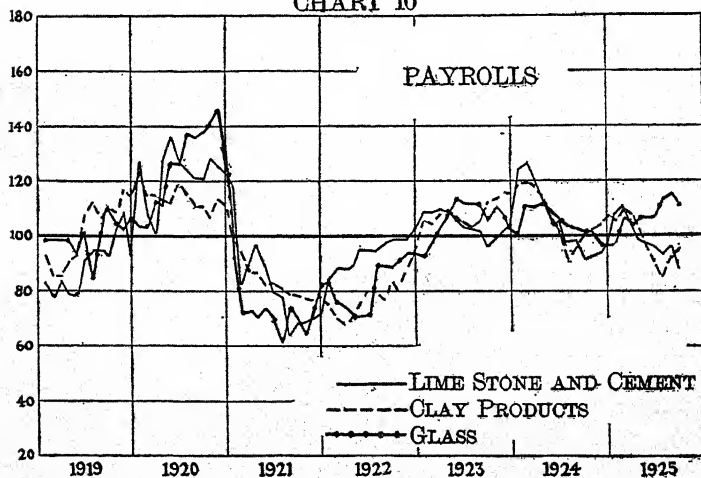


TABLE 27. PAYROLLS BOOTS AND SHOES

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	95	119	74	100	112	102	97
February	89	110	90	99	113	102	101
March	87	119	90	95	116	102	103
April	89	124	93	94	116	98	99
May	94	122	95	94	116	94	99
June	95	122	99	94	106	86	90
July	97	111	97	97	103	86	95
August	97	102	97	97	107	93	101
September	100	89	96	100	107	99	97
October	104	81	94	99	108	101	
November	111	82	94	107	105	93	
December	117	78	100	109	102	93	

STONE, CLAY AND GLASS

TABLE 28. PAYROLLS LIME, STONE AND CEMENT

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	83	127	118	84	109	125	108
February	78	110	83	88	109	127	111
March	84	101	90	88	110	120	106
April	79	127	97	89	109	112	99
May	78	136	89	95	106	105	97
June	91	128	80	95	104	106	96
July	95	124	78	95	103	98	93
August	95	121	64	97	102	99	96
September	93	121	68	99	96	92	88
October	103	128	69	99	100	93	
November	109	125	70	99	102	94	
December	93	123	72	104	104	97	

TABLE 29. PAYROLLS CLAY PRODUCTS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

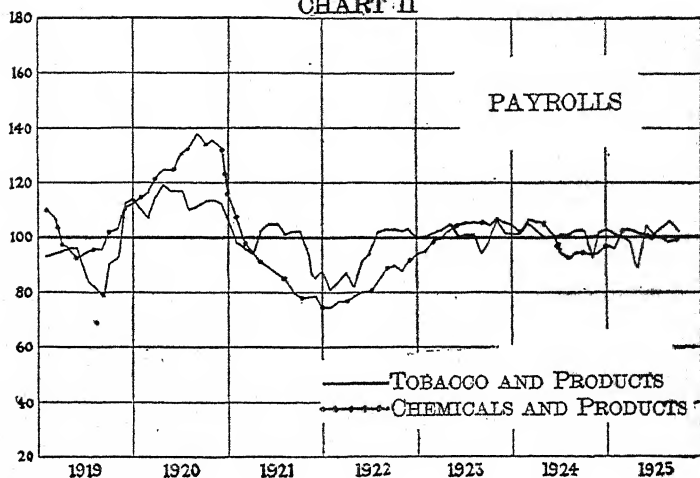
	1919	1920	1921	1922	1923	1924	1925
January	93	123	99	76	106	119	106
February	86	115	94	70	105	120	110
March	86	115	87	68	108	119	109
April	91	114	87	69	110	115	103
May	93	112	82	76	108	107	96
June	108	119	83	80	106	102	91
July	113	115	81	80	104	92	85
August	107	111	79	77	106	96	91
September	111	111	79	84	113	100	95
October	109	107	78	80	114	102	
November	117	114	77	87	116	104	
December	115	112	78	93	116	107	

TABLE 30. PAYROLLS GLASS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	99	104	99	84	93	100	97
February	99	104	72	76	98	111	107
March	99	113	73	75	104	111	104
April	99	112	71	71	107	112	107
May	93	129	74	71	114	108	107
June	102	129	70	72	113	106	108
July	85	138	61	90	113	103	114
August	102	137	75	90	113	102	116
September	111	138	70	89	109	101	112
October	105	141	64	91	111	101	
November	103	147	72	94	108	97	
December	107	134	83	94	103	97	

CHART 11



TOBACCO AND PRODUCTS

TABLE 31. PAYROLLS TOBACCO AND PRODUCTS
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	93	110	98	81	100	102	101
February	94	105	96	84	102	106	100
March	95	115	94	87	103	103	98
April	96	119	102	82	105	100	89
May	96	117	105	91	100	100	104
June	85	117	105	94	101	101	101
July	82	110	101	102	101	101	104
August	78	111	102	103	94	103	106
September	90	113	102	103	100	103	102
October	92	113	96	102	107	93	
November	112	112	85	103	102	102	
December	114	107	87	100	102	103	

TABLE 32. PAYROLLS CHEMICALS AND PRODUCTS
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	111	116	108	75	95	102	97
February	108	117	98	77	99	107	103
March	98	122	95	77	100	106	103
April	96	125	92	79	103	106	101
May	93	125	89	80	105	102	101
June	95	131	87	81	106	95	100
July	96	133	85	85	106	92	100
August	96	138	80	89	106	95	98
September	103	134	78	90	105	95	99
October	104	136	78	88	107	94	
November	112	133	79	92	106	95	
December	113	116	75	94	105	97	

This group is made up of three branches; Lime, Stone and Cement (wt. 0.5); Clay Products (wt. 2.0) and Glass (wt. 1.0). The earliest to reach the peak of 1920 was clay products, four months sooner than Lime, Stone and Cement and about ten months sooner than Glass. Clay Products and Lime, Stone and Cement reached their lowest points in February and March of 1922. The greatest percentage

decline of the group in the first cycle was that of the workers in the Glass industry who, however, experienced the least decline in the second period. The group as a whole, was one of the latest to reach the lowest point of 1924-25.

TOBACCO AND PRODUCTS

This group began to recover in the third quarter of 1919 and reached the peak in April 1920; the bottom was touched in January 1922, a percentage change of 32.0% from peak to trough. It then attained the peak of 1923 in October and was one of the latest to reach the lowest point in the second period—April 1925. Together with the food and products and printing groups, it indicated the lowest average fluctuation above and below the so-called "normal line" which in this case showed a downward trend of $-.25$ per month.

CHEMICALS AND PRODUCTS

Chemicals and Products began to recover in June 1919, reaching the peak of 1920 in August. They then began to decline and continued to do so until January 1922. After this month payrolls started upward reaching the peak of 1923 in October and attaining a level not nearly as high as it did at the previous peak, in fact 31 points less. Or from a different angle, the percentage decline from peak to trough in the first cycle was 45.6% and in the second cycle it was less than one-third or 14.0%.

SUMMARY

Let us now summarize the chief points of our presentation up to the present. For this purpose a series of tables will be useful. Table 33 summarizes the time sequences of the branches of the eleven major groups.

TABLE 33. MONTHS IN WHICH PAYROLLS REACHED THEIR HIGHEST AND LOWEST POINTS IN THE TWO CYCLES

Month	Lowest Point in 1919	Month	Highest Point in 1920	Year and Month	Lowest Point in 1920-22
Jan.	Printing & Publishing(?)	Jan.	Woolen, Silk	1920 Dec.	Men's Clothing
Feb.	Musical Instruments		Leather Tanning		Men's Furnishing
	Cotton, Woolen, Silk		Automobiles		Confectionery
	Leather Tanning	Feb.	Flour & Gristmill	1921 Jan.	Cotton, Woolen
Mar.	Women's Clothing		Clay Products		Silk, Knit Goods
	Knit Goods		Men's Furnishing	Feb.	Boots & Shoes, Furniture
	Men's Clothing	Mar.	Women's Clothing	Mar.	Automobiles
	Men's Furnishings		Sawmills & Planing		Clay Products
	Boots & Shoes		Knit Goods	Apr.	Non-Ferrous
	Furniture		Boots & Shoes	May	Leather Tanning
	Sawmills & Planing		Heating Apparatus		Paper & Pulp?
	Clay Products	May	Tobacco	June	Printing & Publishing(?)
Apr.	Flour & Gristmill		Men's Clothing		Flour & Gristmill?
May	Automobiles		Animal Products	July	Railroad Vehicles
	Iron & Steel		Confectionery		Heating Apparatus
	Heating Apparatus	July	Musical Instruments	Sept.	Glass, Musical Instruments
	Glass, Chemicals & Drugs		Cotton	Oct.	Iron & Steel
	Paper & Pulp		Furniture	Nov.	Machinery
June	Machinery	Aug.	Machinery		Sawmills & Planing(?)
	Hardware		Non-Ferrous Metals	1922 Jan.	Hardware?
	Non-Ferrous Metals		Railroad Vehicles		Tobacco
	Confectionery		Chemicals & Drugs	Feb.	Animal Products?
July	Animal Products		Paper & Pulp		Flour & Gristmill?
	Bread & Bakery	Oct.	Bread & Bakery	Mar.	Clay Products(?)
Aug.	Railroad Vehicles		Iron & Steel	Sept.	Bread & Bakery
	Tobacco		Printing & Publishing		

TABLE 33. MONTHS IN WHICH PAYROLLS REACHED THEIR HIGHEST AND LOWEST POINTS IN THE TWO CYCLES—*Continued*

Year and Month	Highest Point in 1923-24	Year and Month	Lowest Point in 1924-25
1923		1924	
Jan.	Woolen?	June	Boots & Shoes
Mar.	Women's Clothing	July	Cotton, Woolen, Silk
	Boots & Shoes		Men's Furnishings
Apr.	Non-Ferrous Metals		Women's Clothing
May	Cotton, Men's Clothing		Furniture, Leather Tanning
	Leather Tanning		Iron & Steel, Machinery
	Printing & Publishing?		Clay Products?, Automobiles
	Woolen?		Chemicals & Drugs
June	Silk, Knit Goods	Aug.	Paper & Pulp
	Furniture		Knit Goods, Hardware
	Iron & Steel?		Sawmills & Planing
	Railroad Vehicles		Non-Ferrous Metals
	Paper & Pulp	Sept.	Railroad Vehicles
July	Sawmills & Planing	Nov.	Men's Clothing, Glass
	Machinery		Heating Apparatus
	Heating Apparatus		Confectionery
	Hardware?	Dec.	Printing & Publishing
August	Animal Products	1925	
Oct.	Iron & Steel?	Mar.	Animal Products
	Hardware?	July	Musical Instruments
	Chemicals & Drugs?		Clay Products
	Musical Instruments?		
1924			
Feb.	Clay Products		
	Automobiles		
	Chemicals & Drugs?		
	Musical Instruments?		
Apr.	Iron and Steel?		
	Printing & Publishing?		

In the majority of cases the timing of the employment and payroll series were identical. The following were the exceptions in each phase. The numbers following the industries are the number of months by which employment preceded payrolls.

1919—Sawmills and planing (1); railroad vehicles (2); automobiles (1); men's clothing (2); furniture (1); animal products (3).

1920—Sawmills and planing (3); hardware (?); heating apparatus (?); boots and shoes (4); furniture (?); leather and tanning (1); animal products (5).

1921-22—Iron & steel (2); hardware (3); heating apparatus (1); sawmills & planing (11); automobiles (1); leather tanning (3).

1923-24—Heating apparatus (1); railroad vehicles (1-2); silk (1); leather tanning (1); animal products (2).

1924-25—Heating apparatus (3); sawmills (1); knit goods (1); furniture (?); musical instruments (2).

The earliest to recover from the war were the industries connected with the production of the various articles of wearing apparel, and construction. Payrolls began to move upwards in the first quarter of 1919; in cotton, woolen and silk manufacturing, men's and women's clothing, men's furnishings, leather tanning, shoes, sawmills and planing, clay products, and we may also include automobiles; in the second quarter, iron and steel, heating apparatus, glass, chemicals, machinery and hardware; in the third quarter payrolls of railroad vehicles and tobacco began to recover.

With one or two exceptions those industries that began to recover earliest from the war reaction were the first to reach the peak of prosperity. All the branches of the textile industry (with the exception of cotton manufacturing and men's clothing); the leather and products group, automobiles, sawmills and planing, reached the peak in the first quarter of 1920. The metals group reached their highest point not before the third quarter of 1920.

Then, too, those industries which began the road to recovery earliest and reached the peak of prosperity earliest, were also the first to reach the trough of depression. By the end of the first quarter of 1921, the textile group, automobiles, clay products, lumber and products (employment), leather and products (employment) hit the bottom of depression. In the second quarter followed the payrolls of railroad vehicles and the paper and printing group. In the third quarter, the iron and steel group reached bottom. In the first quarter of 1922, tobacco and food products reached their lowest point.

In the second cycle, the earliest to reach the peak of 1923 were once more the wearing apparels group, i. e., the branches of the textile industry and the leather and products group; also furniture and perhaps the paper and printing group. Railroad vehicles reached their highest point in June

of 1923. In the months of July and October, sawmills and planing, and the iron and steel group attained their peak. Automobiles and clay products reached the highest point of prosperity in the first quarter of 1924.

In the recession of 1924, most of the industries reached their lowest points in the month of July. Almost every group is represented in this identical timing of the troughs of 1924. Men's clothing, glass, heating apparatus, confectionery, printing and publishing reached the bottom in the last quarter of the year, whereas animal products, musical instruments and clay products reached their lowest points in the first two quarters of 1925.

From this summary, we discover that there appears to be a consistent time-order in the movements of payrolls in these two cycles. Those industries turning out goods that minister directly to the wants of the consumer seemed to precede in activity as well as decline, those industries which supply what is usually referred to as "producers' goods" or the instruments and basic materials requisite for enabling the first group to operate. This was true, however, only when we compared the major groups of manufacturing establishments; for we have seen that when the attempt was made to classify the subdivisions of each group according to their nearness to the primary source of the process of manufacture, or put differently, according to their distance in the industrial structure, from the ultimate consumer, the relation was reversed in most cases. Whether this is due to the smallness of the sample, or specialized character of product turned out by some of these branches, or the strength of labor organization, size of establishment, greater unity in policy of price and output on the part of manufacturers, we are unable to say.

Does the same generalization hold when comparison among the subdivisions of the different major groups are

made? Machinery, hardware and heating apparatus were the subdivisions chosen to represent the metals group. Machinery represents an industry furnishing "capital" or "instrumental goods". Hardware and heating apparatus might be considered to stand in a position mid-way between the two major classes of goods, namely, producers' and consumers' goods. Knit goods, men's clothing, boots and shoes, and furniture, were taken to represent the group of industries turning out goods for direct consumption. A comparison of the charts of these branches reveals the following time-order relation: Payrolls in the branches of consumers' goods industries began to move upwards about three months earlier than the others, and with the exception of furniture, they were the first to attain the peak of prosperity. They also reached the trough of depression of 1920-21 much earlier than the payrolls of the other branches. In the second cycle, they reached the peak about two months before the others, although in the recession of 1924 their low points were almost identical with that of the others. We see therefore, that the proposition enunciated above—i. e., the precedence of payrolls of consumers' goods industries over payrolls of producers' goods industries, receives additional support when comparisons are made among the subdivisions of the respective major groups.

Can we attach any significance to this relationship? That industries furnishing articles of wearing apparel should precede those supplying producers' goods on the upward and downward movements in the two cycles, may at first appear more than a coincidence. For, does not the earlier movements of the wearing-apparel group seem to point to a slackening of activity in the distributive channels due to slowing-up of purchases by consumers; and would this not be felt first by cotton, and woolen mills, shoe factories, and then by steel, machinery and transportation?

There are two erroneous assumptions underlying these questions. The first, which we may dismiss at once as a logical fallacy, is that precedence in time makes for demonstration of causal relationship. The second, or what is perhaps a specific case illustrating the first assumption, is that only when the wearing apparels group, which presumably stands in an advantageous position to register the buying pulse of the consumer, is ready to expand or contract operations, will the metals, fuel, construction, and transportation industries follow suit. It is just as logical for the reverse to be the case, that is, for textiles to be busy because the steel group is. Other cycles have shown definitely that consumers' goods industries will follow the lead of industries turning out producers' goods. But the question still remains, was not the reverse the case in the two post-war cycles? It is best to postpone the answer to this question until the last chapter where other pertinent data will be considered.¹

Meanwhile, let us summarize the comparative size of the cyclical changes of payrolls. Here we are dealing with quantities which are shrouded by fewer doubtful points than were the points previous by summarized. Table 34 furnishes the standard deviations of payrolls ranked according to size and the standard deviations of the corresponding employment series.

With a few exceptions, the amplitudes of cyclical fluctuations fall in with the classification previously given. The capital-goods' industries include iron and steel, machinery, non-ferrous metals, heating apparatus, railroad vehicles, sawmills, hardware and glass. These show the greatest fluctuations. In the second class, we might group consumers'-goods industries into two divisions, those that furnish the materials for wearing-apparels group, i. e., woollens, cottons, leather and men's furnishings, and those that stand even

¹ See *infra*, pp. 153-164.

TABLE 34. STANDARD DEVIATIONS OF INDICES OF PAYROLLS AND
EMPLOYMENT, 1919-1925
PERCENTAGE DEVIATIONS FROM SECULAR TRENDS CORRECTED FOR SEASONAL
VARIATIONS

<i>Industry</i>	<i>Payrolls</i>	<i>Employment</i>
Iron and steel crude	28.3	17.0
Automobiles	24.7	20.9
Machinery	23.3	17.1
Non-ferrous metals	21.5	15.5
Musical instr's.	20.5	14.1
Heating apparatus	20.1	15.0
Men's clothing	19.8	11.3
Woolens	19.7	16.1
Glass	18.6	
Hardware	17.4	11.7
Railroad vehicles	17.2	14.8
Sawmills and planing	16.5	11.3
Paper and pulp	16.2	7.7
Knit goods	16.0	11.9
Cottons	15.3	8.5
Leather tanning	15.1	11.4
Chemicals and drugs	14.9	9.1
Men's furnishings	14.9	
Clay products	14.7	
Furniture	11.8	8.7
Animal products	11.0	8.9
Silks	10.9	6.5
Women's clothing	10.7	6.0
Boots and shoes	9.8	9.4
Confectionery etc.	8.8	
Flour and gristmill	8.7	
Tobacco and products	8.6	6.9
Bread and bakery	8.0	6.4
Printing and publishing	7.7	3.8
Women's headwear	7.5	

closer to the ultimate buyer such as shoes, women's clothing, food products, and printing. The last group would be the luxury group, such as automobile and musical instruments. These showed fluctuations next to that of the metals group. In short, wages fluctuated most violently in industries furnishing equipment goods; a little less violently in luxury

goods, then followed wearing apparel; finally food, tobacco and printing.

Some points with regard to the immediate factors that have entered into the changing payrolls may be indicated. Undoubtedly, the major factor in the fluctuating wage-bill as indicated by the previous two tables, is the change in the number of hands receiving a pay envelope. The other elements are changes in wage rates, overtime or part-time, bonuses paid or absenteeism due to illness or other causes. Let us first consider the relation between employment and payrolls.

In his "Cycles of Unemployment in the United States", pp. 70, 71, Professor Berridge has declared that employment "probably forecasts by a few months the commercial buying power of those large numbers of our people whose earnings are in the form of industrial wages". Do we find this to be the case in individual industries?

In at least two-thirds of the employment and payroll series, there was an identical timing in the turning points of the different phases of the two cycles. On page 53 will be found the exceptions for each phase. At the most there was only one case where employment consistently preceded payrolls and that was sawmills and planing which varied from one to eleven months in its precedence. In some cases it is difficult to ascertain whether these exceptions are due to imperfections arising from a seasonal index calculated on the basis of a seven-year period. On the other hand, some of the series may have shown other than synchronous relationships had the seasonal indices not obscured the results. Whether this be true or not, the fact remains, as is shown by an examination of the employment and payroll series when uncorrected for seasonal and secular trends, that in the vast majority of cases both series are identical in timing of their cyclical movements.

TABLE 35. PERCENTAGE DECLINES OF AVERAGE HOURLY EARNINGS AND AVERAGE WEEK PER WAGE EARNER FROM THE HIGHEST QUARTER TO THE LOWEST QUARTER IN EACH OF TWO CYCLES

Industry	Average Hourly Earnings				Average Week per Wage-Earner
	All Wage Earners	Male Unskilled	Male Skilled	Women	All Wage Earners
Iron and steel:					
1st cycle	39.0	....	....	....	22.4
2nd cycle	4.0	....	....	....	20.4
Foundry and Machine Shop Products:					
1st cycle	22.1	25.1	20.5	18.1	17.4
2nd cycle	1.4	1.8	1.8	....	8.0
Automobile:					
1st cycle	17.8	22.2	20.5	15.0	7.7
2nd cycle	1.8	....	....	....	9.3
Cotton (North):					
1st cycle	26.4	26.1	26.1	27.2	20.4
2nd cycle	10.7	10.8	10.0	12.0	20.4
Cotton (South):					
1st cycle	27.1	30.0	30.0	20.1	7.0
2nd cycle	14.5	11.9	15.8	14.3	18.2
Hosiery and Knit Goods:					
1st cycle	19.0	35.8	17.8	12.7	3.5
2nd cycle .....	....	....	....	....	12.2
Silk Manufacturing:					
1st cycle	18.5	22.6	14.8	20.1	....
2nd cycle	9.1	7.5	9.2	9.3	....
Wool Manufacturing:					
1st cycle	21.1	26.1	20.2	22.1	....
2nd cycle	8.4	10.0	7.5	9.8	16.2
Leather Tanning and Finishing:					
1st cycle	22.8	29.5	22.6	31.5	7.8
2nd cycle .....	....	....	....	....	8.1
Boots and Shoes:					
1st cycle .....	....	10.5	....	....	8.1
2nd cycle	8.4	....	....	....	8.4
Paper and Wood Pulp:					
1st cycle	25.3	27.5	20.0	28.0	9.2
2nd cycle .....	....	2.6	2.7	7.3	7.7
Printing & Publishing Newspaper & Periodical:					
2nd cycle	6.1	....	4.7	3.9	7.7
Lumber and Mill Work :					
1st cycle	20.0	30.0	16.2	....	5.9
2nd cycle	6.7	10.0	....	....	3.8

TABLE 35—(Continued)

Industry	Average Hourly Earnings				Average Week per Wage-Earner
	All Wage Earners	Male Unskilled	Male Skilled	Women	All Wage Earners
Furniture:					
1st cycle	10.0	21.6	14.6	20.0	12.0
2nd cycle .....	....	....	....	....	7.1
Meat Packing:					
2nd cycle	24.5	30.3	22.7	33.0	4.1
Chemicals:					
1st cycle	23.1	27.2	18.5	16.2	4.7
2nd cycle .....	....	...	....	....	5.1

Source: Wages in the United States 1926, National Industrial Conference Board.

The typical relation between employment and payrolls seems to have been as follows: In the first cycle, payrolls reached greater heights than employment because of considerable increases in wage rates, overtime and payment of bonuses. In almost all cases in the phase of depression, employment reached lower depths than payrolls, probably indicating that the reduction in the number of men employed was proportionately greater than the reduction in wage rates or in hours worked per man, or perhaps that employment of high-priced men was reduced less than employment of cheaper help. Then payrolls lagged behind employment up to the peak of 1923, indicating perhaps that the rate of increase of the numbers employed was greater than the increase in wage rates or time worked per laborer; or that the increase in the numbers employed took place at lower rates for labor. From the peak of 1923 to the end of 1925 the movements of the two series were very close; in some cases payrolls kept slightly above employment and in others slightly below.

It seems to be reasonably clear from table 35 that in addition to employment, the biggest factor in the changes of payrolls were changes in the rates of remuneration of labor followed by changes in time of operation per laborer. In the second cycle, curtailment of time worked per individual played a more important role than changes in wage rates in such industries as iron and steel, foundry and machine-shop products, automobiles, and cotton manufacturing. For the period as a whole, the force of employment can be seen by comparing its standard deviations with that of the standard deviations of the corresponding payrolls.

A few words of caution with regard to the use of table 35; Average hourly earnings per wage earner are affected by the proportion of skilled and unskilled labor, as well as by the number of women attached to the different industries. It is for this reason that we have given the percentage declines for each cycle separately for skilled and unskilled males, and women. There is a further limitation that average hourly earnings do not accurately reflect changes in wage rates, since they are subject to changes in the conditions of employment.

Before we go any further, let us examine the character of the indices that we have employed. The Federal Reserve Board's indices of payrolls and employment which formed the bulk of the data used throughout our study, were secured especially in the earlier years from several sources. "Statistics compiled by the U. S. Bureau of Labor Statistics, the Interstate Commerce Commission, the U. S. Employment Service, the New York, Massachusetts, Illinois, Wisconsin, and Iowa departments of labor and the Federal Reserve Bank of Philadelphia were combined to make indexes for 33 different industries. . . . For the period since 1923, however, they have been composed almost entirely of data com-

piled by the U. S. Bureau of Labor Statistics. These statistics are now collected from nearly 9000 establishments in 52 industries and cover about 2,800,000 employees, with a weekly payroll of about \$75,000,000. Figures are used from 45 of these industries reclassified into 33 industries, which in turn are divided into 11 groups. The indexes may be considered as representative of conditions in manufacturing industries as a whole, which during 1923 employed 8,800,000 workers and paid out weekly wages averaging over \$200,000,000" (Federal Reserve Bulletin, May 1925, page 325).

So far as the method of construction goes the Federal Reserve Bulletin has the following to say—"The source data from which the indexes were constructed were in terms of month-to-month percentages of change, or link relatives, which were multiplied together in order to secure for each industry continuous series or chains of relatives from the various sources. In combining these chains into industry indexes, the series for each State were weighted in accordance with the relative importance of that State in the particular industry. The data from the U. S. Bureau of Labor Statistics which covered several sections of the country, were given the greatest weights which, furthermore, were increased as these statistics became more comprehensive. The resulting indexes were expressed in terms of relatives with the monthly average for 1919 as the base or 100. The general index was a weighted average of these relatives for individual industries. This second set of weights was based upon the relative importance of the several industries as indicated by the figures for total wages paid from the 1919 and 1921 census of manufactures. Comparisons later made with similar figures from the 1923 census showed no changes large enough to make necessary a revision of weights. By this method of weighting, indexes were secured for 11 in-

dustrial groups and for a few subgroups as well as for a combination of all industries". In addition, they add, "Indexes thus secured were adjusted as to level on the basis of data from the biennial census of manufactures. Partly because of the inadequacy of the statistics in many cases and to a certain extent because of the tendency toward a mathematical bias in the method of combining the links, the industry chain relatives, although reflecting with a fair degree of accuracy month-to-month changes tend over longer periods of time to depart from the general trends of employment in the given industries. This bias or trend, when it appeared in a given industry, was corrected by the use of figures from the biennial census of manufactures, which show for 1919, 1921 and 1923 the average number employed each month and the total yearly wages paid in each industry. . . . In general, if the index for 1921 was below the relatives (on a 1919 base) for the census figures of that year, the index was raised, beginning in 1919 with a small increment of increase, which was enlarged each month until the end of 1921. The same general procedure was followed in the payroll indexes."

How representative are these figures of factory workers? It was stated above that reports were gathered from about 9,000 establishments. This is only about 5% of the total number of establishments reported by the U. S. Census of Manufactures of 1923. But these establishments employed 2,800,000 of the 8,000,000 workers. This is a little over 30% of factory workers recorded by the census of 1923. An index of employment that represents one-third of the workers attached to industry is considered by those most experienced in gathering such data to have considerable statistical reliability.¹ The chief difficulty arises in the selection of representative firms. In this connection, the important question is the size of the plants from which

¹ See Hurlin and Berridge, *Employment Statistics for the United States*, p. 64 et seq.

reports of employment and payrolls were obtained. The Federal Reserve Board assures us in the above quotation, that its choice of reporting firms aimed to be typical of industry, both geographically and industrially. However, the estimate that 5% of the number of establishments employed one-third of the workers attached to industry, seems to point to a bias in the data in favor of the larger establishments. In the light of Dr. W. I. King's investigation we would have to infer that this bias would tend to accentuate the amplitude of the cyclical fluctuations of the indices which have been presented.¹

When we examine the number of establishments and figures of employment of the individual series and compare the size of the sample with the corresponding figures given by the Census of Manufactures, we find that the summary figure for the country as a whole is to a large extent misleading. Since the bulk of the data used in the construction of these indices is identical with that given out by the U. S. Bureau of Labor Statistics, the best way we have of approximating the adequacy of the sample is to take the number employed in a given month, as reported by the Bureau of Labor Statistics, and compare it with the number employed during the same month as reported by the Census of Manufactures. We chose September 1923. In comparing the number of the establishments reporting to the Bureau of Labor Statistics with the Census of Manufactures, we used a date that would give a favorable picture to the size of the sample in this case of the former. We chose the last month of our study as a basis of comparison with the census figures. The results of these comparisons are given in table 36.

The last column which shows the ratios of the figures for the number of establishments, reveals the fact that the sample of the data which was used was much larger in most of the

¹ W. I. King's *Employment Hours and Earnings in Prosperity and Depression*, pp. 32, 55, 105, et seq.

TABLE 36. EMPLOYMENT AND NUMBER OF ESTABLISHMENTS OF THE "SAMPLE" USED, COMPARED WITH SIMILAR DATA OF THE CENSUS OF MANUFACTURES OF 1923

	Employment U. S. C. of M.	Employment U. S. B. of L. S.	%	Number of Estab- lishments U. S. C. of M.	Number of Estab- lishments B. of L. S.	%
	1	2	3	4	5	6
Iron and Steel	392,574	216,842	55.2	658	208	31.6
Structural Ironwork	53,814	16,181	30.0	1,056	146	13.8
Foundry and Machine Shop Products	453,440	145,681	32.1	8,531	805	9.4
Hardware	51,519	22,496	43.6	473	58	14.3
Machine Tools	33,995	11,749	34.5	350?	157	44.9?
Steam Fitting and Steam and Hot Water Heating Apparatus	44,980	35,971	79.9	236	128	55.0
Stoves	49,981	15,960	31.9	588	87	12.7
Cotton Goods	459,436	139,298	30.3	1,375	331	24.0
Woolens and Worsteds	185,676	61,368	33.0	851	191	22.0
Silk Goods	123,379	50,328	40.7	1,598	201	12.6
Hosiery and Knit Goods	192,387	69,822	36.2	2,323	257	11.0
Men's Clothing	197,667	57,444	29.0	4,607	274	29.0
Men's Furnishings	61,353	22,572	36.7	971	80	8.2
Women's Clothing	158,839	14,969	10.7	7,046	183	2.5
Women's Headwear	56,580	11,439	20.2	2,693	84	3.1
Lumber, Sawmills	316,670?	71,735	22.6	?	400	?
Lumber, Millwork	104,651?	25,901	24.7	?	251	?
Furniture	167,701	38,805	23.1	3,043	367	12.1
Musical Instruments	24,821	7,235	29.1	210	38	18.0
Car Building and Repairing, Steam Railroads	494,011	168,804	34.0	1,801	509	28.2
Motor Vehicles and Motor Bodies and Parts	404,070	275,328	34.3	2,471	208?	8.4?
Paper and Pulp	119,715	49,216	41.1	746	204	27.4
Printing, Book and Job	129,646	24,835	19.1	10,075	250	2.4
Printing, Newspapers	115,514	41,884	36.1	10,267	199	2.6
Animal Products	134,361	92,519	68.8	1,397	79	2.0
Flour	37,082	14,032	37.8	5,232	360	5.7
Bread and Bakery Products	166,145	35,109	21.1	18,739	411	2.2
Confectionery and Ice Cream	90,596	15,611	17.2	2,762	127	4.5
Leather Tanning, etc.	58,040	25,094	3.2	597	127	18.2
Boots and Shoes	228,681	88,974	38.9	1,606	222	8.5
Cement	36,848	22,118	60.0	133	83	52.4
Brick and Tile	109,083?	24,721	22.6	1,983	389	19.6
Pottery	33,331	11,784	35.3	304	58	19.0
Glass	70,028	24,166	34.5	333	128	38.0
Tobacco Products	147,248	34,294	23.3	3,672	175	4.8
Chemicals	73,512	15,745	21.4	736?	97	13.2

Column 1 gives the employment figures of the U. S. Census of Manu-

Column 2 gives the employment figures of the U. S. Bureau of Labor Statistics as given in the Monthly Labor Review of Dec. 1923.

Column 3 was obtained by dividing column 2 by column 1.

Column 4 gives the number of establishments as reported by the U. S. Census of Manufactures of 1923.

Column 5 gives the number of establishments included by the U. S. Bureau of Labor Statistics in its index of employment of September 1925. See Monthly Labor Review, November 1925.

Column 6 obtained by dividing column 5 by column 4.

individual series than the summary figure for the United States indicated. Furthermore, these ratios and the ratios of the employment figures were much closer in most cases than the summary figures suggested. Nevertheless, some bias in favor of the larger establishments seems to exist. We must recall however, that the Federal Reserve Board stated in the May 1925 issue of the Federal Reserve Bulletin, that when the indices deviated from the figures as given by the Census of Manufactures for the years 1919, 1921, 1923, they were adjusted by the aid of the latter figures. Since the census years were crucial years in the discussion of the cycle, exaggerations in the amplitudes of fluctuations would largely be eliminated by correcting the indices in terms of the biennial census data. Whether the methods of adjustment removed the bias in the inter-census years with any great success, we are unable to say.

STATISTICAL APPENDIX

The indices of payrolls that we have used, cover a period of 81 months. For elimination of trend and seasonal elements, a time interval of much greater length would be desirable. We might have gone back a few years for some industries—as far as 1915. But the addition of 4 more years, which were largely influenced by war conditions, would be of little assistance. We therefore confined ourselves to the two post-war cycles. The data of payrolls as presented by the Federal Reserve Board, were expressed in terms of the average of 1919 as a base. Should we have

left them in that form? Or perhaps, not trusting the average of one year as a base, should we have expressed the monthly series in terms of the average of four years, such as the period from 1919-22? Or ought we to apply a straight line trend for the seven year period?

We were primarily interested in the time-order as well as magnitude of the cyclical changes from 1919-25. While the influence of the choice of base on the time-order of the series would be negligible, it would be of some importance in comparing the amplitudes of fluctuations, particularly in those industries which showed considerable growth. It can therefore be seen why the use of 1919 as a base would be unsatisfactory. The same objection would hold, although not to the same degree, to the use of the years 1919-22. For in the second half of the period the use of this base would lead to an exaggeration of the resulting ratios or residuals as compared with the first half of the period. The least objectionable procedure seemed to be the employment of a straight-line trend fitted by the method of least squares.¹ This really involves the use of two averages. One, a central value or average of the items, which in the case of those industries which for the period covered show no annual increment or decrement, forms the base of the period, and the other average is the annual (or monthly) increment or decrement which added to or subtracted from the central value tends to make the residuals smaller or larger depending upon the size of the monthly increment as well as the distance from the central value. The following are the equations for the lines of trends for payrolls as well as employment for the period 1919-25. The increments are in monthly units.²

¹ Examination of the uncorrected data suggests that an equation of the second degree which would be graphically represented by a parabolic curve might be preferable to a straight-line fit at the most in two or three cases. Experiments with such curves showed that the slight improvement in the "accuracy" of the fit would not warrant the much greater amount of labor necessary.

² $x=0$ at May 1922 in all the indices.

TABLE 37. EQUATIONS OF THE LINES OF SECULAR TREND

	<i>Payroll Indexes</i>	<i>Employment Indexes</i>
United States	$y = 102.5 + .02x$	$y = 95.5 - .03x$
Metals and products	$y = 91.0 - .17x$	$y = 90.0 - .15x$
Iron and steel products	$y = 91.0 - .16x$	$y = 89.0 - .16x$
Iron and steel, crude and int. ...	$y = 92.0 - .04x$	$y = 94.0 + .03x$
Machinery	$y = 88.0 - .30x$	$y = 85.0 - .30x$
Hardware	$y = 108.0 + .36x$	$y = 103.0 + .10x$
Heating apparatus	$y = 113.0 + .30x$	$y = 103.0 + .17x$
Non-ferrous metals	$y = 99.0 - .10x$	$y = 93.0 - .06x$
Textiles and products	$y = 108.0 - .06x$	$y = 99.0 - .03x$
Fabrics and materials	$y = 110.0 + .20x$	$y = 99.0$
Cottons	$y = 100.5 - .27x$	$y = 98.0 - .08x$
Woolens	$y = 113.0 + .24x$	$y = 102.0 + .14x$
Silk	$y = 110.0 + .28x$	$y = 97.0 - .06x$
Textile products	$y = 108.0 - .06x$	$y = 99.0 - .06x$
Knit goods	$y = 120.0 + .32x$	$y = 105.0 + .14x$
Men's clothing	$y = 107.5 - .13x$	$y = 103.0 + .02x$
Men's furnishings	$y = 119.0 + .01x$	$y = 108.0 - .08x$
Women's clothing	$y = 96.0 - .32x$	$y = 83.0 - .44x$
Women's headware	$y = 107.0 - .02x$	$y = 99.0$
Lumber and products	$y = 104.0 + .08x$	$y = 99.0 + .14x$
Sawmills and planing	$y = 100.0 + .02x$	$y = 98.0 + .14x$
Furniture	$y = 124.0 + .50x$	$y = 108.0 + .30x$
Musical instruments	$y = 93.7 - .29x$	$y = 82.0 - .44x$
Railroad vehicles	$y = 98.0 - .15x$	$y = 92.0 - .13x$
Automobiles	$y = 112.0 + .63x$	$y = 98.0 + .37x$
Paper and printing	$y = 124.0 + .37x$	$y = 102.0 + .01x$
Paper and pulp	$y = 108.0 - .08x$	$y = 102.0 - .04x$
Printing and publishing	$y = 131.0 + .53x$	$y = 104.0 + .06x$
Food and products	$y = 101.0 - .04x$	$y = 92.0 - .13x$
Animal products	$y = 82.0 - .40x$	$y = 80.0 - .31x$
Flour and gristmill	$y = 87.0 - .37x$	
Bread and bakery products	$y = 126.0 + .37x$	$y = 109.0 + .18x$
Confectionery and ice cream ...	$y = 109.0 + .20x$	
Leather and products	$y = 97.0 - .09x$	$y = 92.0 - .07x$
Leather tanning	$y = 82.0 - .33x$	$y = 81.0 - .29x$
Boots and shoes	$y = 102.0$	$y = 94.0$
Stone, clay and glass	$y = 123.0 + .68x$	$y = 108.0 - .38x$
Lime, stone and cement	$y = 135.0 + .70x$	
Clay products	$y = 131.0 + 1.00x$	
Glass	$y = 100.0 + .02x$	
Tobacco products	$y = 98.0 - .25x$	$y = 94.0 - .20x$
Chemicals and drugs	$y = 98.0 - .14x$	$y = 83.0 - .38x$

TABLE 38. INDEXES OF SEASONAL VARIATIONS—PAYROLLS U. S., 1919-1925

Industries	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
United States	98	100	102	100	101	100	96	99	100	102	101	103
Metals and products	100	103	105	102	101	98	94	97	98	100	100	103
Iron and steel prod.	102	102	103	101	101	97	93	100	100	98	98	101
Iron and steel, crude and inter.	102	107	108	101	101	98	93	100	101	98	97	99
Machinery	102	102	103	102	102	100	98	97	96	98	98	101
Hardware	100	103	104	103	104	99	93	97	97	100	101	103
Heating apparatus .	96	104	104	102	101	98	87	95	103	107	104	105
Non-ferrous metals	101	101	104	102	100	99	93	97	100	101	102	104
Fabrics & materials	102	102	100	99	98	99	99	98	99	97	100	107
Cotton	102	102	100	100	101	101	97	97	101	96	97	106
Wool	97	97	100	102	107	105	101	100	102	96	98	102
Silk	95	101	105	103	105	100	97	99	100	102	96	97
Textile prod.	100	106	112	102	96	96	97	101	102	101	95	98
Knit goods	97	103	105	102	101	97	92	101	98	99	102	102
Men's clothing	103	107	109	92	91	99	105	105	100	95	92	99
Men's furnishing ...	101	102	106	105	106	101	96	85	93	98	99	104
Women's clothing ..	104	116	118	104	88	80	93	103	105	108	93	89
Women's headwear.	105	107	114	113	98	93	87	95	104	100	93	96
Lumber and prod. ...	96	98	101	100	100	102	97	101	102	102	102	102
Sawmills & planing ..	95	98	99	99	101	104	100	101	101	100	100	99
Furniture	96	102	106	98	96	92	91	96	99	105	108	108
Musical instruments ..	97	99	103	99	98	97	100	97	100	103	107	106
Railroad vehicles ..	99	99	101	98	98	98	95	99	98	104	104	106
Automobiles	78	92	100	106	111	105	103	105	102	105	99	93
Paper and print. ...	102	100	102	101	99	98	96	97	100	100	100	104
Paper and pulp	100	101	101	99	98	99	98	102	99	102	101	102
Print. & publishing ..	103	100	101	99	99	98	97	95	99	100	101	106
Food and prod.	98	99	100	95	98	101	101	100	104	104	104	102
Animal prod.	105	100	97	94	97	101	101	93	97	100	104	105
Flour & gristmill ..	102	101	100	95	95	96	96	101	105	107	103	102
Bread & baker prod.	95	98	99	95	99	103	106	102	105	102	102	98
Confectionery and ice cream	93	95	98	90	93	92	93	98	109	114	114	113
Leather and prod. ...	103	104	103	98	97	97	97	103	102	101	97	101
Leather tanning ...	101	103	104	100	100	98	96	99	99	101	100	103
Boots and shoes ...	102	103	102	96	95	97	98	104	103	101	97	101
Stone, clay & glass.	89	86	92	101	106	106	101	105	104	105	105	102
Lime, stone and cement	76	77	86	97	103	106	108	109	115	112	108	102
Clay products	81	81	88	99	111	114	112	114	106	105	97	92
Glass	105	103	106	103	101	98	87	88	92	100	106	108
Tobacco prod.	102	97	100	94	98	100	97	96	100	101	106	108
Chem. and prod. ...	102	99	101	99	99	98	98	97	98	103	102	103

The seasonal indices were calculated in most cases by the method of link relatives—see W. M. Person's Indices of General Business Conditions. In some cases the method of ratio-to-ordinates was used—see article by Helen D. Falkner in the Journal of the American Statistical Association, June 1924.

CHAPTER II

CYCLICAL FLUCTUATIONS OF PURCHASING POWER AND PRODUCTION IN MANUFACTURING ESTABLISHMENTS

1919-1925

THE chief problem in the previous chapter was to compare the cyclical fluctuations of workers' incomes from the point of view of sequence of movement as well as magnitude of change, and to analyze the constituents of payrolls. Our second problem will be to study these incomes from the point of view of their buying power. For it is common knowledge that the pay envelope must be translated into terms of the commodities the wage earner can buy at different times, to get a satisfactory picture of his relative economic status—especially when price changes were as frequent and of such unusual size as was the case during, the greater part of the period covered.

But there is another reason for computing an index of real income of factory workers. We desire to examine those theories of business cycles which claim that the chief factor in the movement from prosperity to depression are bound up with the discrepancy which arises because the wage earner or consumer produces more than he can buy back, or to put it differently, the worker produces values in greater abundance than his money income enables him to take off the market at any given time. In other words, the discussion generally runs in terms of two units, a commodity basis and money basis—a confusion, or convenient division, if you will, which runs through the treatment of our money economy at the hands of different theorists. We will there-

fore compare the relative movements of the value of the product with the money income of the worker, as well as the physical volume of production with his real income. In this chapter we shall, however, confine ourselves to the construction of indices of real wages for the eleven major groups of factory establishments.

If there were a uniform distribution of factories in different regions of the country, a cost-of-living index for the United States might suffice to deflate the payrolls of each group of indices. But such, we know, is not the case. The output of the varied articles produced under the classes of steel, textiles, lumber, etc., are not confined in the main to the same district. Two problems arise in this connection. First, is the degree of variation of the cost of living in different sections from the general cost of living of the United States of sufficient size to invalidate the use of a general cost-of-living index as applied to industries that are strongly localized? Secondly, if such is the case, can we construct "localized" cost-of-living indices?

There are three cost-of-living indices that have been used to deflate incomes. First is a cost-of-living index constructed by the United States Bureau of Labor Statistics; the second is that of the National Industrial Conference Board; and the third is the Massachusetts Cost of Living Index. The Department of Labor's index is quarterly and for some part of the period covered, semi-annually. The National Industrial Conference Board furnishes a monthly index since January, 1920. The Massachusetts index is also monthly. To get the Bureau of Labor Statistics index on a monthly basis, its quarterly indices were used as basic data and the intervening months were interpolated by the aid of the National Industrial Conference Board's monthly index. On the other hand, to get the National Industrial Conference Board's index for 1919 on a monthly basis, the

cost-of-living index given by Berridge¹ was used to interpolate the data points of its index. All three were reduced to the average of 1919 as a base. A comparison of the three reveals the Bureau of Labor Statistics Index as maintaining the highest level, and Massachusetts the lowest.² An examination of the constituents of these indices shows that the National Industrial Conference Board's index of clothing as well as miscellaneous items was lower than the corresponding figures for the Bureau of Labor Statistics; that rent was higher in the former series, and food was the same.

The Bureau of Labor Statistics furnishes cost-of-living figures for thirty-two individual cities. We can construct regional indices by using the quarterly data for individual cities and interpolating with the National Industrial Conference Board's monthly index for the United States as a whole. But which cities shall we choose? Obviously those cities that would be most representative of the industries whose payrolls are to be deflated. In choosing these representative cities the following difficulties appear: (1) Many industries are situated in places for which the Bureau gives no quotations of retail prices; (2) In many cases we cannot discover what proportion of the total value of the product or the number of workers engaged is localized in a given area, because the United States Bureau of Census in its publications of data for cities over 50,000, does not divulge the necessary information when that information would tend to reveal the private affairs of a given firm that may produce the bulk of the product in that city; (3) Even though we have the leading cities that manufacture a given product, the proportion of the total output or of the total number of wage

¹ *Purchasing Power of the Consumer*, p. 104.

² During 1924 and 1925 the Cost of Living Index of the National Industrial Conference Board was somewhat higher than the index of the U. S. Bureau of Labor Statistics.

earners attached is small compared to the total for the industry; (4) Finally, even though we obtain representative cities, we do not know how comparable they are with the distribution of the payroll data as given by the Bureau of Labor Statistics. Once we have found cities adequate to represent a given industry and have given each city its proper weight in the final index of cost of living, we must, with the aid of the Bureau of Labor Statistics Cost of Living Index for the United States as a basis of comparison, find out to what extent the "localized" index varies from the general index. We will give one illustration—an extreme case—which will reveal the limitations of such indices. Let us take automobiles.

The Census of Manufactures of 1919 reveals Michigan and Ohio as the two leading states in the production of automobiles. Together, they produced 67% of the total value of the country's motor-vehicle output. The two cities for which cost-of-living figures are available for the deflation of payrolls of this industry are Detroit and Cleveland. Although Detroit is well known as a leading automobile center, it furnishes only about one-fourth of the total value of automobiles of the state (exclusive of bodies and parts), while Cleveland produced close to two-fifths of the value of motor production of Ohio. Together, these two cities produced about one-fifth of the total value of passenger-cars and trucks of the country. The quarterly indices for Detroit were given a weight of two and Cleveland one, and the resulting indices were used to construct a monthly series with the aid of the National Industrial Conference Board's index as a medium for interpolation.

This index probably errs on the side of an exaggeration of the rise of retail prices of food, clothing, shelter, etc., and we can not be sure that it is representative of other centers of automobile production. And yet the average

deviation from the United States Cost of Living series was no larger than 5%.

In view of the fact that the average difference from the United States cost-of-living index is 5.0% we shall confine ourselves to the use of the more general series. When a given industry indicated a distinctly urban concentration, and the so-called representative cities showed a cost-of-living index that evidenced insignificant variations from the United States Bureau of Labor statistics representing the country as a whole, we used the general index to deflate; when a given industry was centered in smaller towns and its representative cities were somewhat lower than the cost-of-living figures for the country, we deflated by the use of the National Industrial Conference Board's figures. It seems likely that it would be less hazardous to deflate the eleven major groups of industries than the payroll series of the thirty industries given in the previous chapter, on the theory that where one branch would warrant a cost-of-living index that was above the general level of the country and another branch of the same group and equal weight would require a lower retail price series, the use of the Bureau of Labor Statistics with all its limitations would be a better compromise than the use of a dubiously constructed localized cost-of-living series. For example, in the textile products group, the payrolls of knit-goods ought to be deflated by a cost-of-living index lower than the Bureau of Labor Statistics; whereas men's and women's clothing, by a higher cost-of-living series. We compromised by deflating the group as a whole by the Bureau of Labor Statistics index for the United States. Let us now turn to the actual data.

How do the purchasing power series compare with the payrolls of the eleven major groups of industries? An examination of Chart 12 which represents the two series for the United States as a whole, will make unnecessary a

graphic comparison of payrolls and purchasing power indices for *each* of the eleven groups. The typical relation between the two is illustrated in the case of the United States figures. In the boom period, payrolls reached greater heights than real incomes, and in the phase of depression, they reached lower levels, although the difference between the two in the latter period was markedly less than in the former. From 1922 on, the purchasing power indices were generally above the corresponding payroll series. Towards the peak of 1923 they were closer than at any other time. From the middle of 1924 to end of 1925 the relationship as revealed by this chart is not typical of about half the series. In fact the reverse was the case, namely, payrolls kept below purchasing power figures. The following are the figures:

TABLE 39. PAYROLLS UNITED STATES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	96	122	88	77	103	107	102
February	88	118	85	79	104	111	105
March	87	124	84	79	108	108	105
April	88	123	84	79	110	108	104
May	88	124	81	82	113	101	103
June	92	127	81	85	114	97	102
July	99	125	81	87	114	93	103
August	101	125	80	88	111	94	102
September	105	122	79	91	111	96	101
October	98	116	77	93	112	98	
November	106	109	77	98	111	97	
December	112	98	77	99	107	100	

CHART 12

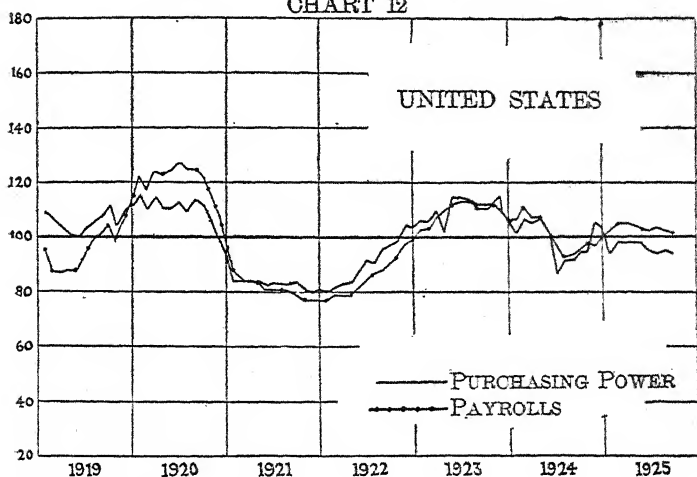


TABLE 40. PURCHASING POWER DISBURSED UNITED STATES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	110	116	84	80	106	102	94
February	108	111	84	82	106	107	98
March	105	115	84	83	110	106	98
April	102	111	84	84	102	107	98
May	100	111	83	88	115	102	98
June	104	113	84	92	115	87	95
July	106	110	83	91	114	92	94
August	108	114	83	96	112	92	95
September	112	112	84	98	112	95	94
October	105	106	81	99	112	95	
November	110	100	80	105	115	105	
December	112	94	81	104	106	104	

The amplitude of fluctuations as shown by the following table was less for the indices of real incomes than for money incomes.

TABLE 41. STANDARD DEVIATIONS OF PAYROLLS AND PURCHASING POWER
INDICES OF ELEVEN MAJOR GROUPS OF INDUSTRIES, 1919-1925

PERCENTAGE DEVIATIONS FROM SECULAR TRENDS CORRECTED FOR SEASONAL
VARIATIONS

	<i>Payrolls</i>	<i>Purchasing Power</i>
Iron and steel products	24.2	21.1
Fabrics and materials	13.9	11.7
Textile products	12.6	11.1
Lumber and products	14.8	10.9
Railroad vehicles	17.2	14.3
Automobiles	24.7	24.3
Paper and printing	9.0	4.8
Food and products	6.7	6.0
Boots and shoes	9.8	10.0
Stone, clay and glass	14.4	11.0
Tobacco products	8.6	7.1
Chemicals and drugs	14.9	10.0
United States	13.8	10.9

The lower variation of the purchasing power indices was to be expected in view of the fluctuation of retail prices

TABLE 42. IRON AND STEEL PRODUCTS PURCHASING POWER DISBURSED¹
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	125	123	92	60	107	112	107
February	123	117	75	60	109	114	108
March	112	121	74	61	109	115	104
April	103	115	67	67	113	115	103
May	98	116	66	74	124	110	106
June	98	121	60	79	125	99	102
July	99	122	55	83	121	93	102
August	108	123	54	86	121	92	102
September	115	123	54	85	120	93	101
October	101	120	55	96	121	99	
November	110	116	58	103	119	99	
December	113	103	57	108	113	102	

TABLE 43. RAILROAD VEHICLES PURCHASING POWER DISBURSED²
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	130	93	103	76	112	97	95
February	113	90	92	78	111	101	105
March	110	95	94	86	117	101	104
April	104	95	78	82	119	107	101
May	103	107	78	90	124	107	100
June	97	109	77	95	127	106	96
July	97	104	79	61	126	103	97
August	87	122	80	74	124	100	93
September	97	121	83	95	124	100	93
October	91	118	85	103	122	102	
November	97	117	86	112	118	99	
December	89	116	83	110	111	98	

within narrower limits than workers' incomes. In the boom period the disbursement of payrolls reached higher levels than retail prices. They also reached lower levels in the period of depression, and from 1922 on, the relatively even

¹ Payrolls deflated by Cost of Living Index of the U. S. Bureau of Labor Statistics.

² Payrolls deflated by Cost of Living Index of the U. S. Bureau of Labor Statistics.

CHART 13

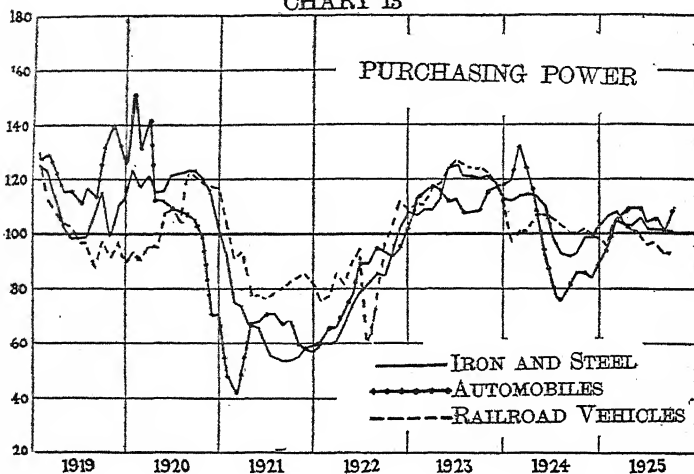


CHART 14

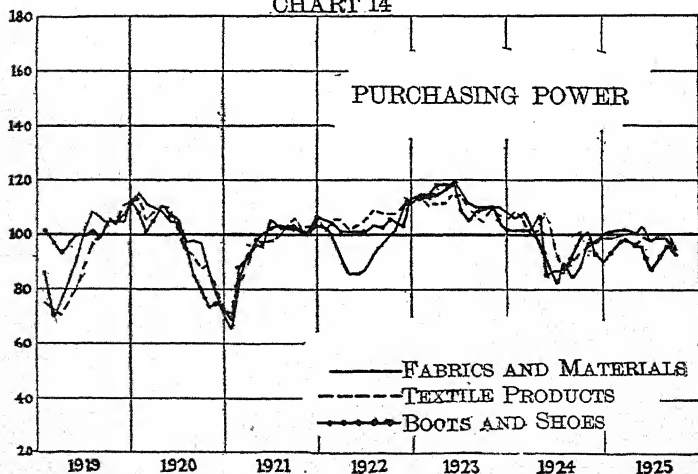


TABLE 44. AUTOMOBILES PURCHASING POWER DISBURSED¹

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	128	151	49	60	113	120	94
February	130	132	41	66	115	132	105
March	122	142	48	66	118	124	108
April	116	113	67	72	117	114	110
May	116	113	68	78	112	94	110
June	112	110	73	90	113	82	105
July	117	109	73	90	108	75	106
August	114	108	67	95	108	79	101
September	131	106	69	94	109	86	110
October	140	99	60	92	116	86	
November	133	71	58	95	118	84	
December	126	72	59	101	118	88	

TABLE 45. FABRICS AND MATERIALS PURCHASING POWER DISBURSED²

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	87	116	66	103	114	106	101
February	70	112	85	100	114	108	102
March	75	110	92	90	115	103	102
April	84	109	99	86	116	98	100
May	91	105	100	86	120	88	93
June	103	105	103	87	116	82	88
July	109	97	104	93	112	89	89
August	106	98	103	96	110	84	89
September	105	97	104	100	110	88	84
October	105	85	100	102	110	97	
November	105	79	101	114	110	97	
December	113	70	104	111	108	99	

course of retail prices, as compared with an upward trend of money incomes, made for a greater buying capacity among factory workers. To get at the root of the narrower range of variation of our purchasing power indices, we must

¹ Payrolls deflated by Cost of Living Index specially constructed, see text, p. 62.

² Payrolls deflated by Cost of Living Index of the National Industrial Conference Board.

TABLE 46. TEXTILE PRODUCTS PURCHASING POWER DISBURSED ¹

	ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS						
	1919	1920	1921	1922	1923	1924	1925
January	75	113	71	101	115	109	99
February ,.....	73	105	81	106	111	107	100
March	71	108	88	106	114	100	98
April	77	110	98	102	114	102	96
May	81	110	97	103	117	109	99
June	86	103	98	106	117	97	98
July	97	95	99	109	111	88	100
August	99	93	104	108	107	89	100
September	106	88	106	108	105	94	95
October	104	89	102	108	110	96	
November	111	80	103	111	108	98	
December	112	72	106	111	106	99	

TABLE 47. BOOTS AND SHOES PURCHASING POWER DISBURSED ²

	ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS						
	1919	1920	1921	1922	1923	1924	1925
January	102	108	69	106	115	102	94
February	97	100	89	105	115	102	98
March	94	106	92	101	119	101	98
April	96	111	97	101	119	108	96
May	100	107	96	101	119	85	96
June	100	106	106	100	109	87	87
July	102	98	104	104	106	87	91
August	99	85	103	103	109	92	96
September	105	79	103	106	110	100	93
October	104	73	101	104	111	101	
November	107	75	100	103	105	93	
December	112	73	107	114	102	91	

grapple with a host of interesting questions centering about the stability of our price structure during the past four years and the phenomenal behaviour of that structure during the first three post-war years. Obviously, these questions cannot be considered without resorting to the wider field of

¹ Payrolls deflated by Cost of Living Index of the U. S. Bureau of Labor Statistics.

² Payrolls deflated by Cost of Living Index of Massachusetts.

"theories of business cycles"—a discussion of which it would be best to postpone for later consideration. Meanwhile, we will compare the buying power of workers of the eleven major groups.

TABLE 48. LUMBER AND PRODUCTS PURCHASING POWER DISBURSED ¹

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	94	121	81	89	108	107	100
February	95	116	81	88	105	110	101
March	92	118	82	93	107	107	99
April	95	111	81	94	110	109	99
May	96	108	80	95	112	106	99
June	101	105	82	96	113	102	97
July	106	104	76	96	115	98	96
August	106	112	80	102	111	99	99
September	109	106	76	99	111	101	
October	103	105	75	102	112	104	
November	107	96	75	103	112	103	
December	109	93	81	104	112	104	

TABLE 49. CHEMICALS AND PRODUCTS PURCHASING POWER DISBURSED ²

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	116	105	103	80	103	107	102
February	117	101	92	79	103	109	105
March	103	104	89	81	104	110	105
April	97	104	88	83	107	110	103
May	92	104	86	84	108	106	103
June	94	109	85	85	109	99	101
July	92	109	84	90	109	97	101
August	90	106	79	94	109	99	99
September	100	104	79	97	110	100	98
October	100	115	79	94	110	98	
November	104	113	79	97	108	98	
December	104	105	79	101	110	103	

¹ Payrolls deflated by Cost of Living Index of the National Industrial Conference Board.

² Payrolls deflated by Cost of Living Index of the U. S. Bureau of Labor Statistics.

CHART 15

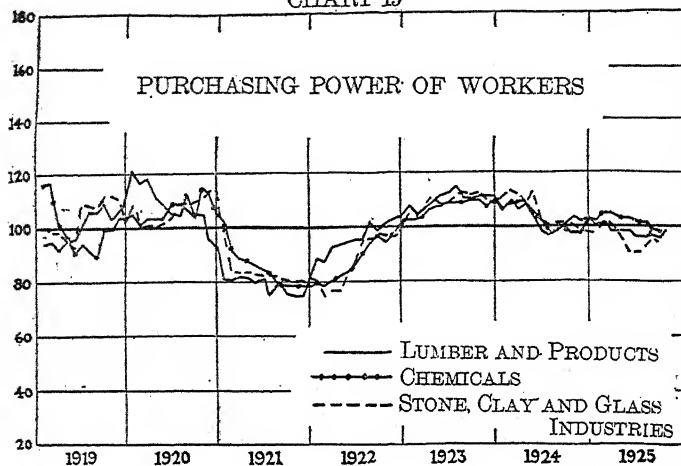


CHART 16

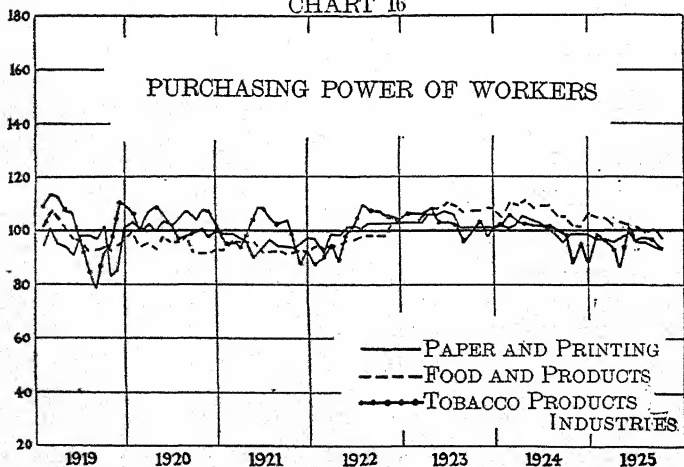


TABLE 50. STONE, CLAY AND GLASS PURCHASING POWER DISBURSED ¹

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	100	109	99	81	105	112	98
February	99	100	84	75	104	114	102
March	99	101	83	77	107	113	100
April	96	100	84	77	111	110	96
May	93	102	83	83	109	114	91
June	109	104	83	88	109	103	91
July	109	109	83	96	111	100	92
August	108	109	82	96	113	101	96
September	112	110	81	98	112	101	94
October	112	111	80	97	113	101	
November	111	114	80	97	111	99	
December	103	114	82	100	109	98	

TABLE 51. PAPER AND PRINTING PURCHASING POWER DISBURSED ²

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	94	103	99	97	104	102	97
February	101	100	99	92	104	101	97
March	95	102	97	99	104	102	96
April	94	100	96	99	107	105	97
May	91	103	90	101	107	104	99
June	98	102	93	102	108	103	96
July	98	104	96	101	107	101	96
August	97	107	95	103	101	99	95
September	101	104	94	103	101	96	93
October	83	107	94	103	101	99	
November	85	107	95	103	101	99	
December	101	103	98	103	101	99	

The real incomes of the three industries that showed the most conspicuous variations in the buying power of factory workers are given in Chart 13. Employees attached to the production of motor-vehicles showed the greatest range of

¹ Payrolls deflated by Cost of Living Index of the National Industrial Conference Board.

² Payrolls deflated by Cost of Living Index of the U. S. Bureau of Labor Statistics.

TABLE 52. FOOD AND PRODUCTS PURCHASING POWER DISBURSED ¹

	ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS						
	1919	1920	1921	1922	1923	1924	1925
January	102	99	93	95	104	105	105
February	108	94	96	94	104	110	105
March	104	96	96	95	107	109	102
April	102	93	96	95	109	111	103
May	97	98	96	97	109	108	102
June	97	96	92	97	111	109	101
July	93	96	93	99	110	109	99
August	93	98	93	99	107	105	100
September	94	92	92	99	108	105	97
October	93	92	92	99	108	102	
November	95	92	93	105	109	101	
December	98	93	93	104	109	106	

TABLE 53. TOBACCO PURCHASING POWER DISBURSED ²

	ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS						
	1919	1920	1921	1922	1923	1924	1925
January	109	107	96	88	107	103	99
February	114	100	96	90	107	106	96
March	113	107	94	95	107	103	94
April	108	109	104	89	109	103	86
May	107	107	109	99	104	102	101
June	95	103	109	102	104	102	96
July	87	97	105	110	103	102	97
August	79	98	103	108	96	100	97
September	92	99	104	108	99	99	93
October	95	100	98	107	104	88	
November	111	98	86	106	98	96	
December	110	100	92	105	101	89	

fluctuation of their real wages. It should be noted that we are comparing automobiles with the iron and steel products group, and not with the branch of iron and steel (crude and intermediate) the purchasing-power index of which would

¹ Payrolls deflated by Cost of Living Index of the U. S. Bureau of Labor Statistics.

² Payrolls deflated by Cost of Living Index of the U. S. Bureau of Labor Statistics.

probably show greater variations than automobiles. This last mentioned industry was the first of the three to reach the bottom of 1921 after having been the first to decline from the peak of 1920. It was however, the last to reach the turning point of prosperity of 1923-24. Those supplying equipment for the railroads showed the least variation of the group.

The wearing apparels group, as represented by Fabrics and Materials, Textile Products and Boots and Shoes, is indicated on Chart 14. They showed a very close relationship both in the timing and the amplitude of fluctuations of their workers' real incomes.

We have grouped Lumber and Products, Stone and Clay and Chemicals together (Chart 15). These represent the classes that prepare materials chiefly for construction purposes. It is interesting to note that whether measured by standard deviations or by graphic comparison, the movement of buying power of the workers in this group was more typical of that composite picture known as the buying power of factory workers in general, than was true of any other group.

The last three charts, relating to paper and printing, food products, and tobacco, represent the workers whose buying power manifested the least cyclical fluctuations.

This is a convenient place to compare the movements of the real wages of factory workers with the volume of goods turned out by them. Do real incomes increase proportionately to the output of goods? This may be a legitimate question from the point of view of evaluating the distribution of the net income of industry among its "rightful" recipients, but of what significance is it in dealing with the short-time fluctuations of cyclical phenomena? For it must be remembered, that to get at real wages, money incomes are translated into terms of com-

modities that have been produced many months previous to the output of goods for which the workers received their current remuneration, and with which comparison is then proposed. In other words, we are asking ourselves, how, at any given time, do wages when converted into terms of the prices of goods retailers are offering for sale at that time, compare with the volume of goods which will presumably reach the hand of the retailer at a later date?. Is not then the original question futile?

It is true that we have three variables: manufactured products, wages, and the prices of retail commodities, of which only the first two are concurrent in time. To admit that the third variable complicates the inquiry with regard to the relationship of the first two is one thing; to argue that therefore a comparison between purchasing power and output is of no consequence is an entirely different matter. For to confess ignorance of one factor which is undoubtedly pertinent to the situation does not prevent us from finding out the connections between other factors. At the most, it will call for a suspension of judgment in drawing further inferences.

Assuming, then, that the price deflator will not vitiate our comparisons, our first problem will be to find out whether wages lag behind output. If such is the case, is a situation bound to arise in which the rate of movement of goods into retail channels exceeds the rate of movement of purchasing power back to industry through these channels of retail trade with a consequent check to expansion?

We have already described the construction of the indices of purchasing power. The character of the production series is discussed in the text and appendix of the following chapter. An examination of tables and charts reveal the following points:

The amplitude of fluctuations of production are of greater

magnitude than those of purchasing power. This is not the same thing as saying that the ratio of purchasing power to production decreases in prosperity and increases in depression. In the upward movement of the first cycle, production increased somewhat more than purchasing power; this was not true in the second cycle. In fact, in 1923 and 1924 purchasing power kept on a higher level than production in almost all cases. In general, the fluctuations of the two series were very similar. This is shown not only by graphic comparison but by their respective standard deviations. In the case of production and purchasing power for the United States, the standard deviation of the former was 12.9, and of the latter, 10.9.

The more significant comparison, however, is that between the purchasing power of factory workers and the volume of *consumers' goods*. The two monthly indices of production of consumers' goods that might be employed are either those of the Harvard Review of Economic Statistics, or the Federal Reserve Bank of New York. However, these two series eliminate their "trends" on the basis of a time interval different from that of the purchasing power indices. It was thought advisable, therefore, to construct an index of consumers' goods that would cover the period 1919-25 and would be "adjusted for secular trend and seasonal variations."

Since the indices of volume of production of the major groups of industry were already adjusted, all that was necessary was to take those that are generally classed under the category of "consumption goods", and by an appropriate system of weights construct a combined index of the volume of output of consumers' goods. The weights used were the relative values added by the process of manufacture as given by the Census of Manufactures of 1923. The weights are identical with those given in the February 1927 issue of

the Federal Reserve Bulletin. The industries included were: textiles (weight 20); food and products (10); leather and shoes (4) and tobacco (1). The following are the figures:

TABLE 54. PRODUCTION OF CONSUMERS' GOODS UNITED STATES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	106	115	72	98	110	102	103
February	91	108	80	97	111	103	103
March	91	108	92	99	115	94	101
April	104	106	91	89	112	93	101
May	97	103	92	100	111	91	93
June	106	102	99	103	103	83	96
July	111	94	98	102	100	89	103
August	110	90	106	111	104	87	95
September	115	89	105	106	99	99	100
October	116	76	96	106	101	101	
November	110	73	100	116	100	96	
December	115	72	98	110	97	107	

Chart 17 shows that (with the exception of the troughs of depression in both cycles) this index of output of consumers' goods and the index of production of consumers' goods constructed by the Federal Reserve Bank of New York were very similar in their movements. We are not interested in the minor discrepancies. The important point is to compare the purchasing power series with the indices of production.

Chart 17 indicates the movements of the index of purchasing power for the United States as compared with the index of the output of consumers' goods. Up to January 1920, both were practically identical in the magnitude of their fluctuations. Buying power began to exhibit a marked decline about eight months after the volume of production turned its peak. In the first cycle, then, buying power of factory labor kept pace with the volume of goods that was ready for distribution into the hands of retailers. In 1921 and 1922, real wages lagged behind output. It was not until

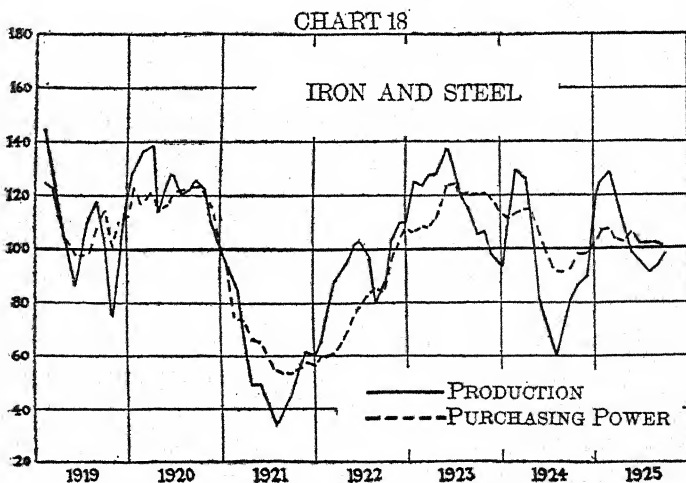
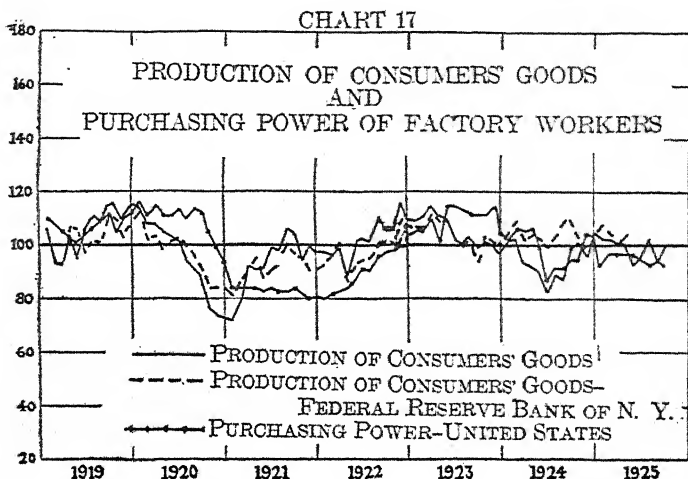


TABLE 55. MANUFACTURING PRODUCTION UNITED STATES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	115	121	76	81	109	106	104
February	106	119	75	83	109	111	103
March	102	120	75	87	114	103	103
April	106	113	75	87	113	101	104
May	105	112	77	98	118	91	100
June	106	111	77	100	111	81	98
July	116	109	77	99	107	84	104
August	116	104	79	98	106	84	92
September	114	104	82	97	101	93	99
October	107	90	77	98	101	93	
November	114	88	84	110	103	93	
December	120	85	83	101	102	104	

TABLE 56. MANUFACTURING PRODUCTION IRON AND STEEL
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	145	130	94	66	125	113	125
February	138	137	86	81	124	130	128
March	122	139	61	89	128	127	120
April	103	114	49	95	128	106	107
May	87	122	49	102	138	81	99
June	100	129	42	104	126	67	95
July	111	121	33	97	119	60	91
August	118	123	40	80	116	71	93
September	105	126	44	89	106	82	98
October	75	123	57	104	107	87	
November	100	110	62	110	98	90	
December	115	102	60	111	94	109	

the end of the first quarter of 1923 that purchasing power began to outrun the volume of production and continued to do so until about the middle of 1924.

The significance of these facts is not altogether clear because the consideration of an important element has been omitted, namely, stocks of goods on the shelves of manufacturers, wholesalers and retailers. As a result of this omis-

CHART 19

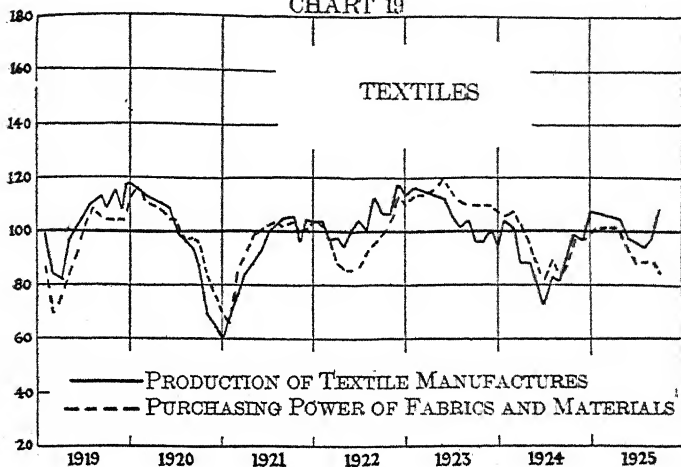
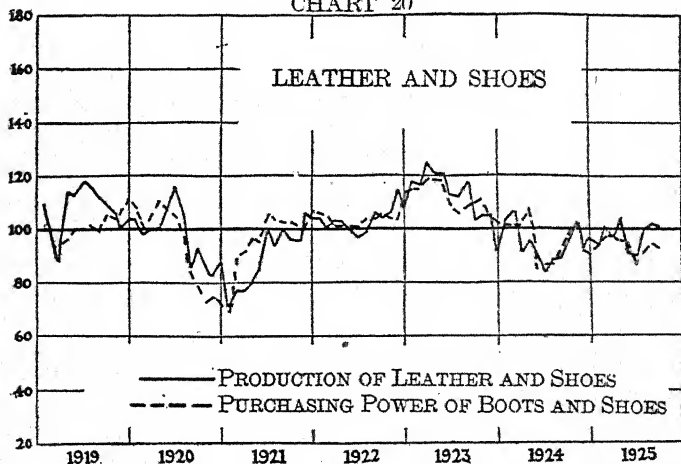


CHART 20



BUYING POWER OF LABOR

TABLE 57. MANUFACTURING PRODUCTION TEXTILES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	99	116	68	104	116	104	107
February	84	113	77	97	116	101	106
March	82	112	85	98	115	88	106
April	96	111	88	95	114	88	105
May	102	109	93	101	113	81	98
June	106	100	101	104	106	73	97
July	110	96	100	100	102	83	95
August	113	93	106	113	104	82	98
September	111	87	106	107	96	93	109
October	115	69	97	107	96	99	
November	109	64	105	118	100	97	
December	118	60	104	114	94	108	

TABLE 58. MANUFACTURING PRODUCTION LEATHER AND SHOES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	110	103	71	105	118	104	94
February	97	98	77	101	117	107	101
March	88	100	77	103	125	92	97
April	114	100	80	103	121	96	104
May	113	108	85	99	121	89	91
June	118	116	100	97	114	84	90
July	116	106	94	99	113	89	100
August	112	86	100	106	118	90	102
September	111	93	96	104	104	95	101
October	106	86	96	106	106	102	
November	100	83	106	115	106	93	
December	103	88	104	107	92	97	

sion, all that can be said, is that in prosperity, the disbursement of real wages kept pace with the output of consumers' goods available for shipment to the distributive trades.

In the depression of 1921-22 and 1924, real wages fell behind output of consumption goods. But this may not be as serious a matter as appears at first sight. For the figures of the volume of commodity stocks show a decline during

TABLE 59. MANUFACTURING PRODUCTION LUMBER
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	111	130	72	94	115	118	120
February	109	124	76	83	100	112	105
March	113	122	79	82	119	107	103
April	116	123	72	80	107	109	101
May	98	105	74	89	109	100	95
June	97	101	72	84	109	88	95
July	108	98	69	90	103	90	101
August	117	102	72	103	112	89	94
September	113	97	69	96	108	91	93
October	120	97	76	104	118	100	
November	115	93	80	117	120	97	
December	114	82	79		112	106	

TABLE 60. MANUFACTURING PRODUCTION CEMENT AND BRICK
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	66	132	87	79	117	106	97
February	70	126	81	82	110	112	96
March	75	134	82	97	119	110	101
April	85	120	81	98	111	107	101
May	110	111	78	105	107	101	111
June	110	110	84	104	101	93	103
July	120	106	83	95	103	93	106
August	121	95	78	98	94	88	108
September	129	97	79	95	94	92	106
October	119	92	73	96	89	86	
November	120	103	83	105	98	93	
December	97	106	86	109	102	102	

this period.¹ This seems to point to the conclusion that the output by mills producing consumers' goods was largely in response to the desire to replenish supplies of merchandise on the part of the distributive trades. Whether stocks on the shelves of retailers had been sufficiently diminished to counteract the discrepancy between real wages dis-

¹ Dr. S. S. Kuznets, *Cyclical Fluctuations*, chap. ii.

CHART 21

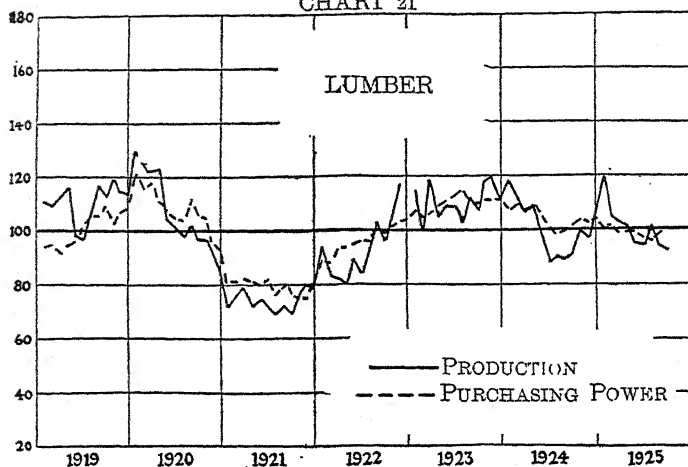


CHART 23

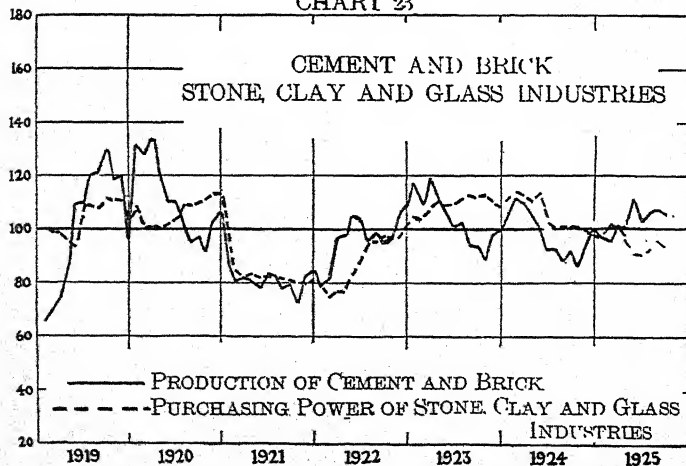


CHART 22

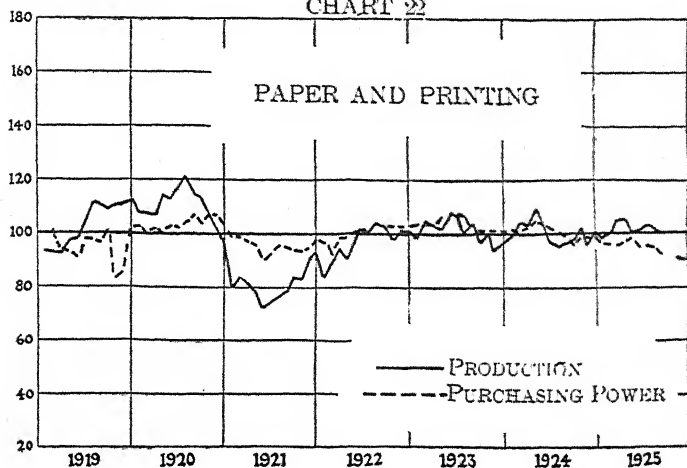


CHART 24

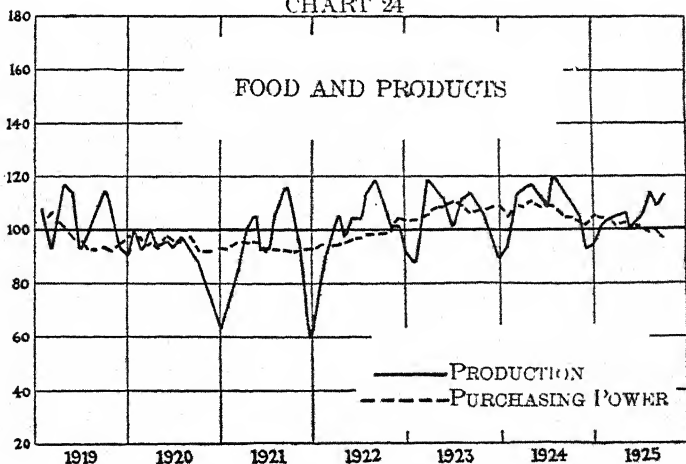


TABLE 61. MANUFACTURING PRODUCTION PAPER AND PRINTING
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	94	109	80	84	99	100	99
February	94	108	84	89	105	105	100
March	93	108	82	95	104	104	105
April	97	115	80	91	102	110	106
May	99	114	73	99	108	102	100
June	104	117	75	101	107	97	101
July	112	121	77	100	100	96	103
August	111	115	79	104	104	97	101
September	110	114	84	103	97	98	100
October	112	107	84	98	100	102	
November	112	103	91	101	95	96	
December	113	98	93	101	97	101	

TABLE 62. MANUFACTURING PRODUCTION FOOD PRODUCTS
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	108	100	71	76	87	93	102
February	93	93	81	92	101	112	105
March	104	100	100	106	119	116	106
April	116	94	105	98	115	117	107
May	114	96	93	105	112	113	100
June	93	93	93	105	101	108	105
July	100	97	106	115	113	120	114
August	109	94	116	119	116	114	109
September	115	89	107	110	110	110	113
October	108	73	97	101	106	105	
November	94	74	76	101	97	93	
December	90	60	60	93	89	94	

bursed and output at the mills, we cannot say. We must suspend judgment upon the lag between purchasing power and production until further information is available.¹

¹ The indices of production and purchasing power as given in Charts 18-25 have not been discussed in detail because of the uncertainty regarding the accuracy of the deflator used in a given industry. Then too, the similar behaviour in the relative fluctuations of production and purchasing power as revealed by these charts, makes a general statement such as is given on pages 88-89 adequate for our purpose.

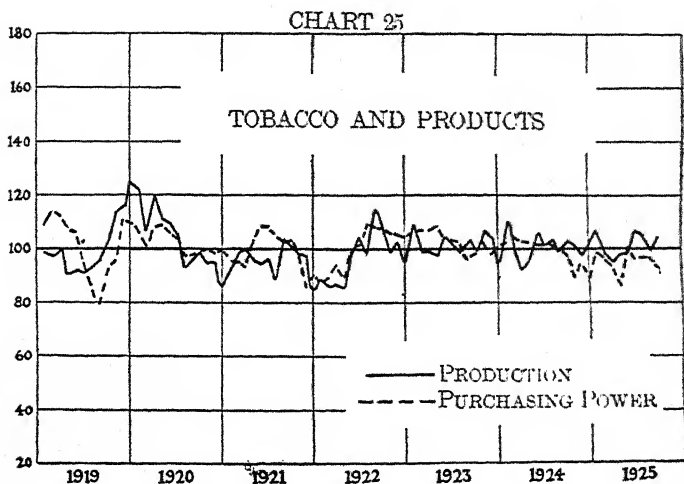


TABLE 63. MANUFACTURING PRODUCTION TOBACCO
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	99	122	93	89	109	110	107
February	97	107	98	86	99	99	98
March	100	120	100	87	99	92	95
April	91	111	96	86	97	95	98
May	92	110	95	99	104	105	99
June	91	106	97	105	102	101	107
July	93	93	89	98	99	103	106
August	95	96	104	115	103	99	99
September	104	99	102	107	99	103	104
October	114	95	98	99	107	101	
November	116	95	98	103	104	97	
December	125	86	85	95	94	102	

CHAPTER III

CYCLICAL FLUCTUATIONS OF PECUNIARY VOLUME OF PRODUCTION, PAYROLLS AND LABOR COST

How did the fluctuations of the values produced in manufacturing plants compare with the wages disbursed? Can we indicate quantitatively with regard to the two cycles—one of such exceptional magnitude and the other of decidedly smaller proportions—to what extent they were caused by discrepancies between the volume of wages and the values created? The more careful exponents of the underconsumption theories of cyclical behaviour, claim that these phenomena are due chiefly to the inadequacies of demand to meet the volume of goods produced at “current prices”. As we have already seen, we cannot compare merely volume of production and wages; we must take into account the very important element of price also.

The usual presentation of production, prices, and wages or employment that is used to support such theories rests, however, on an assumption which does not exactly square with the facts. The implicit assumption is, that the price figures for any given month are those at which the mass of goods turned out that month have been sold. This neglects an item that may be of some importance. The price of goods delivered on order is frequently different from the market price of these goods at the time of delivery. This is especially true in times of sharply rising and falling prices and of some importance in those cases where the trade practice is to order goods about six months in advance of deliveries.

We must then, construct indices of value of output, taking into consideration the time interval between orders given and the receipt of merchandise. Before we present our indices and discuss the problem of the "lag" between production and prices, it will be well to review the production and price series available for our purpose.

The choice of production indexes for the various industries of the manufacturing group has to accommodate itself to the following conditions: (1) When adjusting for seasonal and secular trend, we must see that the period for which the line of trend of production is fitted, should be similar to the other adjusted series with which comparisons are to be made; (2) The wholesale prices that are to be used in multiplying the production series must be those that are representative of the bulk of the goods reported in the given index of production; (3) Finally, in view of the fact that we have about 30 payroll series and 11 groups of purchasing power indices, we must choose those production indices which correspond closest to the branches of industry from which the data of wages have been accumulated.

There are three different monthly indexes of production that are regularly published. The Harvard Review of Economic Statistics furnishes indices of the volume of manufacture adjusted for seasonal and secular trends. The Federal Reserve Bulletin publishes two groups of manufacturing production indices,—one adjusted and the other unadjusted for the seasonal factor. The "growth" factor is not eliminated in either of the two Federal Reserve Board indices.

The first condition would not be met if we were to use the Harvard series. The period for which a line of secular trend was fitted varied considerably, e. g., for pig iron, 1904-14; douglas fir, 1906-19; woolen and worsted spindle-hours active, 1915-22. We desire a line of trend fitted to

the period 1919-25. The Federal Reserve Board's indices were used.

But these indexes differ in their comprehensiveness. The index of "Industrial Activity" includes a greater variety of branches in its major groups of manufacturing production than the "Index of 22 Basic Commodities". But if we use these more inclusive indices of manufacturing production, we encounter another difficulty, namely, that we must find a wholesale price series, or the prices of a group of commodities that cover as broad and wide a field as the given index of manufacturing. On the other hand, a production index of a narrower scope, when multiplied by a price series of narrow range, may correspond more closely with the more specialized industry disbursing payrolls. We have therefore had to resort to both procedures.

The "Index of Industrial Activity" measures not only manufacturing production, but mineral production and agricultural movements. The index of manufacturing production can be treated separately from the other two major divisions. It is constructed as follows: The monthly production of each commodity is divided by the average monthly production of that commodity in 1919. In this way the actual figures are converted into relatives—a method which enables us to compare production series that are expressed in such different units as tons and barrels. To get the total index of manufacturing production for all industries, each set of relatives is multiplied by weights derived from the joint use of the numbers of wage earners employed and the values added by the process of manufacture in 1919. These weights indicate the relative importance of each industry to the total included in the index. To get the final index, these weighted relatives are added, and then divided by the sum of the weights.

The "Index of 22 Basic Commodities" is constructed as

follows: As in the previous index the monthly production of each commodity was divided by the average production in 1919. Then "corrective factors for seasonal variations were obtained by taking the median over a period of years of variations for any one month from the 12 months moving average of data centered at that month; these corrective factors were multiplied by the bases, thus securing an adjusted base for each calendar month; the original data were then divided by the adjusted bases to obtain a series of relatives for each commodity."¹ To get the final index numbers each relative was multiplied by a set of weights determined on the same basis as that stated in the previous paragraph. Averages were obtained by dividing these weighted relatives by the sum of the weights. In most cases the monthly data from January 1913 to December 1921 were used in making the seasonal corrections. This final index includes figures for anthracite and bituminous coal and the non-ferrous metals of copper and zinc. Both of these are excluded from the previous index and are relegated to a separate index of mineral activity.

In most cases we have used the unadjusted indexes of production. These were then corrected for secular trend and seasonal variations by the methods described in the first chapter. In the cases where the Federal Reserve Board's "adjusted" figures were used, they were further "adjusted" by a straight-line trend drawn through the series.

To get at the pecuniary volume of production we multiplied our production series which was adjusted for secular trend and seasonal variations by a wholesale price series (corrected for secular trend) that best approximated the production figures. We allowed for a lag varying in most cases from two to four months between the two,—but of this we will speak a little later.

¹ *Federal Reserve Bulletin*, Dec., 1922.

Of course, it would be more logical if we took the production relatives (with 1919 as base) and multiplied them by wholesale price series (with 1919 as base) and then corrected for trend and seasonal factors. For in our procedure it is difficult to express exactly what is meant by an index of pecuniary volume of output adjusted for secular trend and seasonal variations, when the deviations that were multiplied to get the pecuniary volume of output were measured from two trends which sloped in opposite directions. But when the results were compared with the more "logically" constructed indexes of value of output, they were practically identical. This belief was confirmed by experiment with one-third of the indices presented. But does not the procedure of calculating separate trends and seasonal indices for the production and price series involve much more labor than if we had used the "original" figures and made only one calculation of trend and seasonal elements? This would be true if we had not intended to compare physical volume of production with purchasing power and payroll series. For these comparisons the production series had to be adjusted separately. Once we had these figures in this form, it was much easier to adopt the method we have outlined.

The problem of the time interval between production and prices must be considered in greater detail. The importance of this problem was recently recognized in an article of Professor Irving Fisher called "Our Unstable Dollar and the So-Called Business Cycle" published in the June 1925 issue of the "Journal of the American Statistical Association". The consideration of the "lag" leads Professor Fisher to a conclusion which is diametrically opposed to the methods here proposed. In fact, if accepted, this study would largely be futile. For Professor Fisher concludes that when the lag between production (more accu-

ately, volume of trade) and prices is taken care of, there is no business cycle to account for, whereas the implicit assumption of our procedure is that if we do take into account the lag between production and prices, a more accurate basis for an analysis of the forces making for cyclical fluctuations is established. Let us, therefore, examine Professor Fisher's researches on the subject.

When Professor Fisher correlated the monthly figures of Warren M. Person's Index of Trade for the period August 1915-March 1923 with the rate of rise and fall of the U. S. Bureau of Labor Statistics' Index of Wholesale Prices, and allowed for a lag of 7 months in the former index, he obtained a maximum correlation of $+ .727$. But when, instead of this fixed lag of 7 months, he distributed a lag "spread over one, two, three, etc., months according to the principles of probability" (the special form which the probability distribution took was geometric in character, i. e. the abscissa representing time was expressed logarithmically rather than by the usual arithmetic presentation) he obtained a correlation of $+ .941$ between prices and volume of trade. He then concludes that if there is a correlation of nearly "100%" between trade and projected price changes, the business cycle is a myth. With such correlation "there is little left to explain".

When Professor Fisher uses an index of volume of trade, he is employing a statistical average which is supposed to give a useful picture or working instrument of that complex of phenomena included under the term business cycles. He is therefore recognizing a set of conditions which require explanation. To explain something almost "perfectly" at one point and then to deny that the conditions to be accounted for are existent, is to drag into the discussion a series of verbal confusions. Then too, the fact that such high correlation was obtained does not prove that price changes are the

chief causal factors of business changes. A combination of other forces may be influencing both series, hence the high correlation.¹ The conclusion, therefore, is the least important part of the paper. The discussion of the lag is of much more significance. We had better leave this question until we have examined the problem with reference to our specific inquiry.

Despite Professor Fisher's scepticism of the empirical approach to the problem of the time interval between production and prices, determination of the lag and its distribution can only be built on the solid base of information gathered directly from industrial establishments. Unfortunately, the statisticians have not seen fit to examine this question in their treatment of time series, and so we lack the necessary information to deal adequately with the problem.

For our purpose the question might be put as follows: Which price when multiplied by a production index will furnish the best approximation to the pecuniary volume of goods turned out in a given period? To answer this question, we tried to find out by means of a questionnaire sent to the leading Trade Associations whose industries were covered by our figures; by consulting trade journals and by holding interviews in some cases, what the current trade practice was with regard to the number of months elapsing between orders given by purchasers and the delivery of these goods; also, whether the time interval between orders given to plants and the delivery of goods was longer or shorter in 1919-22 than at present. Approximately, what was the difference?

In a number of cases the correspondents found it difficult to answer because of the large variety of goods turned out in the given industry. A few quotations from those who saw fit to generalize are given:

¹ Then too, Professor Fisher might have obtained as high correlations if he applied the same technique to payrolls and price changes.

The American Iron and Steel Institute—"In general steel products are manufactured on definite order and specifications for each lot, which means that, of course, the order having been placed and the specifications filed with the company, the time of delivery depends upon the time necessary to manufacture the product.

"At the present time this is the interval which prevails for the reason that the steel mills are in a position to fill orders as soon as contracts are arranged. In previous years, however, especially in the year 1920 when the demand for products was in excess of the capacity of the mills to take care of them, and purchasers were not sure of the possibility of the railroads handling shipments promptly, a longer period of time between the order and the delivery necessarily followed."

From the Iron Age—"... a few weeks now elapse between the ordering of steel and its delivery. Since the so-called hand-to-mouth buying set in, a matter roughly of two years since it became thoroughly pronounced, this length of time has applied. . . .

"In the 1919-21 period the books of the mills were filled five and six months, and in some cases longer than that. . . ."

From the American Railway Car Institute—"... Railroads of the country as a rule purchase their rolling stock but once a year. More frequently in the Spring and Fall.

"A carrier having requirement for Refrigerator Cars such as western railroads, purchasing this class of equipment to move its citrous fruits, which are moved in the early Fall, usually place their orders in the early part of the year. Under normal procedure, deliveries usually begin to follow three months after an order has been received."

West Coast Lumbermen's Association—"... elapse of time between placing and shipping, in Pacific Northwest lumber, varies as to class of trade.

"The rail movement accounts for approximately fifty per cent of the total movement, and on such business shipments range from forty-eight hours to thirty days.

"In the cargo trade, both domestic and export, cargoes are accumulated at the mill against the arrival of the steamship which may be thirty, sixty or ninety days."

From a former President of the Institute of American Meat Packers—"The interval of time between the giving of the orders and the delivery of the goods has not materially changed so far as we know in the past ten years. This class of product is only ordered for immediate needs. . . . It is not customary to place an order for delivery months in advance. The great majority of the products is perishable or semi-perishable in nature and therefore trade is on a far different basis from the business in textiles, shoes or metal products."

Almost all the respondents found it easier to generalize upon the second question than the first. They were, except in one or two cases in agreement in their views, that the time interval between orders and delivery was much shorter in the past two years than in the first three post-war years.

A word of caution about the above questions: When we speak about the time elapsing between orders given and the completion of orders, we must be clear about two things. Orders may be said to be completed when the goods are actually delivered to the purchaser, or they may be said to be completed when the manufacturer has finished producing the quantity of goods consigned to the given purchaser. The manufacturer may keep these goods in storage to be shipped on dates the buyer has specified, or he may ship at once. The time it takes for goods in transit is no concern of his. Generally, because of credit limitations, or because of space limitations, or the relative ability of jobbers and manufacturers to store merchandise, or other conditions that might

be mentioned, the bulk of goods on order is not delivered at one time. Shipments are usually stretched over a period of months. From the time of order to the first shipment, six months may elapse; but to the completion, three more months may easily be added. Then too, manufacturers may begin to produce the very same month orders were given, or they may begin several months later. How soon the manufacturer begins to work up his material varies from time to time and is of some importance in the delivery of goods. If the manufacturer expects the price situation to be favorable at the time he is to deliver his goods, and if wholesalers have made commitments of fair size, then production will begin early. If the price situation is uncertain both from the buying as well as the selling angle, production will begin as late as possible.

Forgetting for the moment the development of the "hand-to-mouth buying policy" of various industries during the past few years, let us analyze the trade practice that was taken to be "normal" immediately after the war. It is a safe guess that most factories with which we are concerned were not working on goods the orders for which had been given the same month that the figures for output were gathered. It is an equally safe guess that the bulk of goods in any given month were not produced on orders given a year before that registered by the monthly index of production. Let us assume that orders were given six months before receipt of first shipment by wholesalers. If the wholesaler is accustomed to order the larger part of his needs at that time, the goods that will be delivered to him will be at prices agreed upon by contract six months previously. If there are changes in the wholesale prices of these goods as reported by such agencies as the Bureau of Labor Statistics or Bradstreets, at the time goods are being delivered to the jobber, they indicate chiefly the changes in the quotations on contracts

for additional goods. These changes are largely due to the fact that buyers do not usually order supplies for their maximum needs. They withhold a certain proportion of their orders for a time when a better grasp of the price and demand situation can be obtained. In fact, the rate of sale of the first shipment of goods indicates to the jobber or dealer how soon he will run short of certain numbers, and if the prospects seem favorable, he will reorder. If other jobbers have done the same and many mills are booked to running capacity for the next few months, deliveries on new orders, if promised at all, will be made at higher quotations of price.

These points suggest pertinent questions. What was the previous phase of the cycle? How has it influenced jobbers in their policy of advance orders? How has it left stocks? If, in view of these considerations, it would not seem reasonable to multiply current production by current wholesale prices, it would also seem not altogether satisfactory to multiply production by a fixed price at the time orders were given. We must deal with a *variable lag* which shifts with the phase of the cycle.

We have already suggested one case when price uncertainty at the time commitments were made leads to late operation of mills and jobbers ordered little in advance. Also, if at time of delivery of goods, a phase of revival begins and fairly active prospects of retail purchases appear and stocks are low, then a competition for immediate shipments and rise in price, which is cumulative in character because of the interactions of production and price, sets in.

In those cases (such as 1919-20) where the upward strides in activity take place at rapid rates, the lag between production and prices is subject to a further change—often in two opposite directions. On the one hand, the mills fall behind in their shipments and “unfilled orders” increase consider-

ably. This means that current price quotations are even more at variance with current production than is customary. On the other hand, because of the slow pace of business in previous months, large advance orders were not given, and when the feverish demand for immediate shipments sets in, and jobbers are very optimistic about the future, then manufacturers will upset the usual custom of taking orders, say six months in advance. They will only "open their books" for two or three-month periods. In many cases where prices are quoted for deliveries two and three months ahead, they are subject to revision. As an additional safeguard these orders are subject to further qualifications "to not being able to procure raw materials, or labor troubles or other unforeseen occurrences",—a blanket phrase which enables many a producer to take refuge when it is convenient for him to do so. This tendency would make for a shorter lag. Which was the dominant lag depends upon the industry, although it is likely that the longer lag prevailed in most cases.

If in a rapidly rising market, the manufacturer is hesitant in accepting long-time contracts for delivery, in a falling market the jobber is unusually conservative in his purchases. For several months after the peak of prices, the manufacturer is producing goods at the more favorable quotations on orders given several months previously. And yet we do not find for a very long period, a difference between prices for new orders and old contract orders. Not until the mass of goods has been delivered will the manufacturer lower his price appreciably. If necessary, because of increasing cancellation there will be a revision downward, all along the line, in prices of goods even on the old contracts. And so the lag becomes shorter, and remains short throughout the period of depression.

All these problems should be considered by those who seek to construct indices of pecuniary volume of produc-

tion—the question of the custom in ordering in advance and the question of the different phases of the cycle, both helping to distribute the lag so as to make the best approximation of the monthly price index to the monthly production index.

From this discussion, we see why a purely mathematical treatment of the lag such as that given by Professor Fisher is insufficient. And even if we were to accept his method of treatment, we might add that it would be of greater use if such knowledge as we indicated were utilized.

For our purpose a rough approximation will suffice. In most cases we chose a four months' lag as the customary procedure of trade. This lag was changed to two months after the peak of prosperity in 1920. The same time interval between production and price was used until the latter part of 1922 when it was increased to three and four months. In 1924-25 a four months' interval was employed in some cases, and in others a shorter lag prevailed. These estimates were based upon the weekly and monthly reports by the trade journals of the purchasing policies of buyers. Obviously, another interpreter might make different guesses.¹

How shall we interpret these variable lags? When we take the price of a given month and "push it forward" four or two months and multiply that price by the monthly index of production, we must think of it as the modal value of a frequency distribution. But this "mode" of four months is not the mode of a symmetrical distribution. No matter what scale is used, changing that scale as Fisher does from an arithmetic to a logarithmic one, does not cover up our ignorance of the underlying distribution of the data. We are dealing not with a fixed mode, but a variable one. But we are not only dealing with a *variable lag*, but also with a *variable distribution* about the mode. In other words, it is

¹ See Appendix.

TABLE 64. PECUNIARY VOLUME OF OUTPUT UNITED STATES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January		129	80	66	100	104	105
February		128	73	66	101	109	106
March		134	70	70	107	101	108
April	104	131	66	70	107	98	112
May	101	135	65	81	112	89	111
June	104	134	63	83	106	80	110
July	116	134	62	83	105	82	117
August	118	135	62	85	105	82	101
September	116	134	65	86	98	90	109
October	109	111	62	87	97	90	
November	122	106	67	101	98	91	
December	132	97	67	93	97	105	

TABLE 65. PECUNIARY VOLUME OF OUTPUT IRON AND STEEL
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January		118	112	50	119	123	124
February		127	93	61	120	142	132
March		135	63	57	120	127	126
April		115	50	70	118	115	113
May	105	128	47	77	130	89	105
June	88	151	40	79	123	72	98
July	99	150	31	75	125	63	93
August	101	159	36	66	129	75	94
September	107	164	37	74	118	84	98
October	95	160	45	85	118	88	
November	67	145	49	97	107	89	
December	91	130	47	105	102	108	

not only that the modal values change, let us say from two to four months, but in the process the character of the distribution about the mode may be affected, for instance because of the phase of the cycle.

What differences are shown when the indices of pecuniary volume of production are "adjusted for lags"? In the second cycle, when current production was multiplied by current prices and compared with production indices multiplied

CHART 26

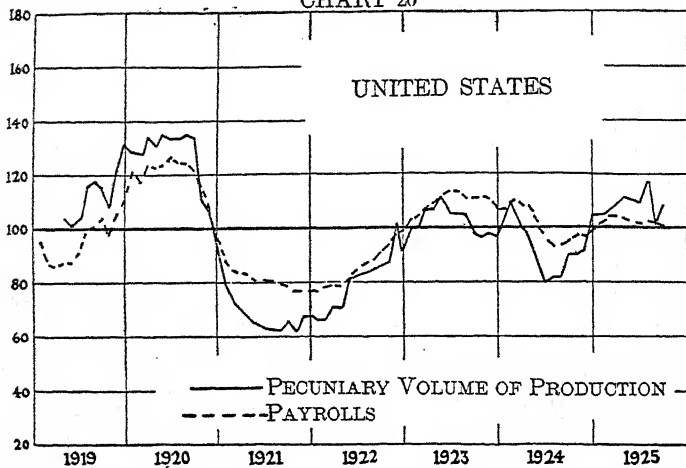


CHART 27

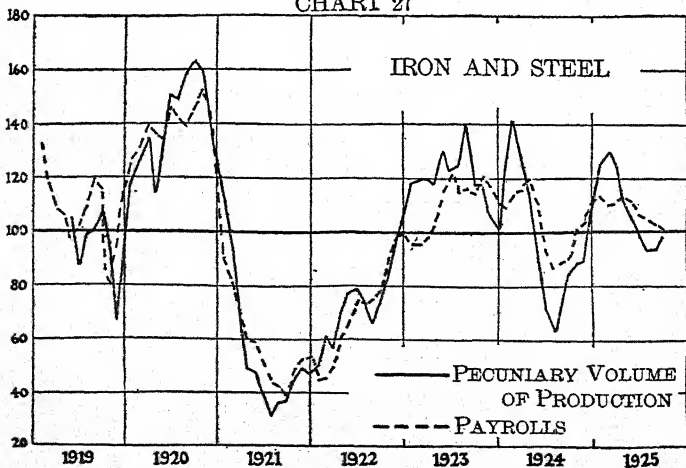


TABLE 66. PECUNIARY VOLUME OF OUTPUT COTTON
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January		126	67	82	101	114	115
February		123	71	77	103	106	114
March		135	60	77	108	102	122
April	85	149	58	67	111	112	135
May	76	149	55	72	118	92	115
June	72	169	58	76	108	78	110
July	79	168	53	70	98	77	113
August	82	154	61	82	103	77	104
September	85	150	66	82	104	100	116
October	108	120	66	87	110	120	
November	110	87	83	102	110	124	
December	118	66	87	92	92	124	

TABLE 67. PECUNIARY VOLUME OF PRODUCTION WOOLEN
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January		139	68	75	94	103	110
February		140	81	79	102	103	110
March		149	83	76	110	105	108
April	96	152	84	71	113	99	105
May	99	144	88	74	112	96	104
June	101	119	89	75	110	92	102
July	103	104	86	76	109	87	100
August	110	100	86	78	109	86	102
September	114	105	85	85	110	95	108
October	120	98	86	94	110	104	
November	127	80	83	92	107	107	
December	132	65	79	94	102	107	

by wholesale prices adjusted for both a four months' fixed lag and a varying one, no differences in the final indices of pecuniary volume of production were evident. This was of course due to the relative stability of the price structure during this period. It was only in the first cycle, that a difference in intensity and duration was found to exist between the adjusted and unadjusted series of pecuniary vol-

CHART 28

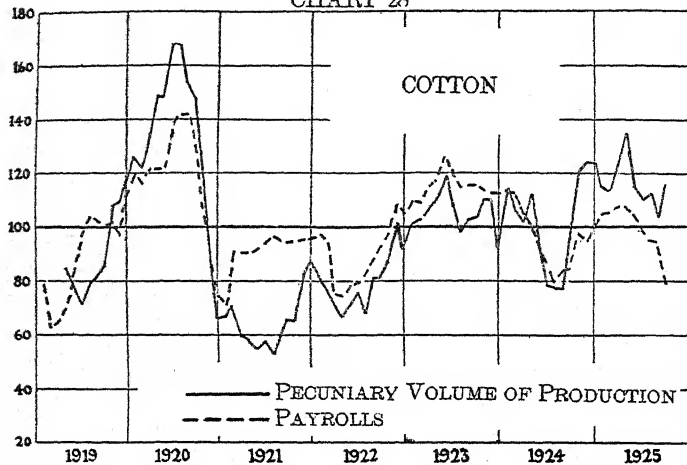


CHART 29

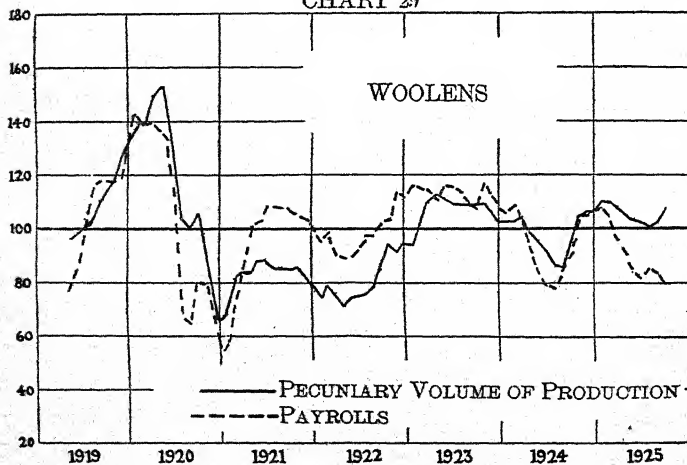


TABLE 68. PECUNIARY VOLUME OF PRODUCTION LEATHER AND SHOES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January		132	69	88	104	99	103
February		125	72	86	103	102	112
March		130	70	84	111	88	111
April	90	128	72	85	109	94	122
May	90	139	77	82	109	88	107
June	95	153	86	78	105	84	105
July	95	141	80	79	105	90	117
August	95	115	85	87	110	90	120
September	94	115	82	86	98	96	120
October	102	102	82	88	101	105	
November	110	92	91	97	101	98	
December	129	94	88	93	86	103	

TABLE 69. PECUNIARY VOLUME OF PRODUCTION LUMBER
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January		148	73	78	118	119	119
February		159	73	66	105	111	107
March	76	179	70	66	127	109	109
April	78	181	58	63	118	111	111
May	67	173	57	70	124	102	103
June	66	163	53	68	127	91	99
July	77	153	50	76	117	93	105
August	98	145	52	93	122	86	96
September	107	135	50	88	114	85	95
October	130	133	54	98	123	94	
November	128	121	60	115	120	94	
December	128	97	61		113	104	

ume of output. The latter reached greater heights in 1920 and declined sooner than the former.

What does an examination of the charts showing comparisons between payrolls and pecuniary volume of production reveal? In all cases in the first cycle, wages lagged behind the dollar volume of output. The two industries which showed the sharpest discrepancy between their respective wages and output were lumber and paper and pulp pro-

CHART 30

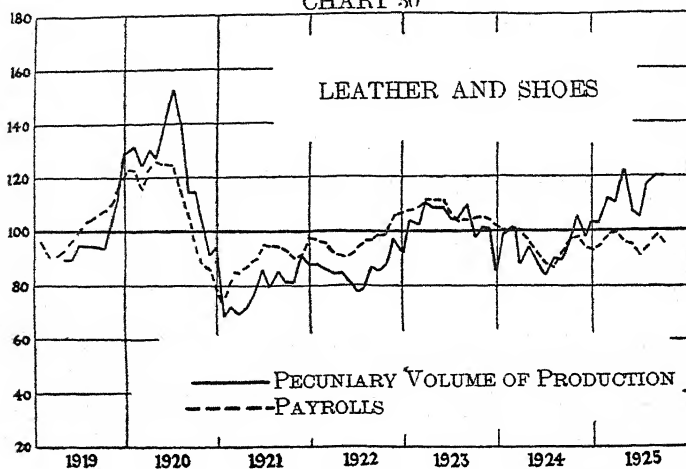


CHART 31

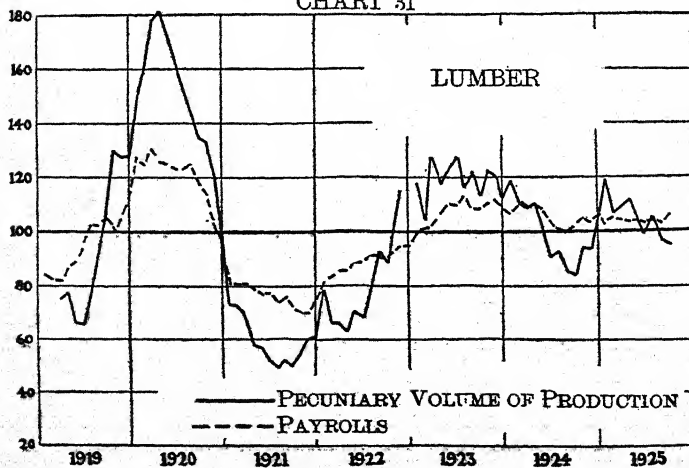


TABLE 70. PECUNIARY VOLUME OF PRODUCTION PAPER AND PRINTING
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January		95	114	65	87	94	114
February		95	99	68	92	99	102
March	82	106	90	73	91	98	104
April	85	114	81	70	92	104	106
May	84	122	69	77	99	100	117
June	88	146	73	80	102	96	119
July	93	163	74	80	96	96	121
August	92	162	73	83	101	96	121
September	92	173	70	83	94	98	121
October	96	168	69	81	97	103	
November	97	163	73	86	92	98	
December	98	157	73	88	92	106	

TABLE 71. PECUNIARY VOLUME OF PRODUCTION FOOD PRODUCTS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	110	123	65	59	77	89	117
February	91	111	69	74	91	107	119
March	105	118	86	87	108	111	122
April	122	121	86	81	106	109	112
May	123	130	74	88	104	106	112
June	98	123	73	89	92	101	120
July	109	126	86	100	104	115	132
August	122	114	97	101	108	118	130
September	123	106	88	95	106	114	136
October	117	81	79	88	104	112	
November	104	82	62	90	95	101	
December	105	57	48	85	87	106	

duction. In view of the fact that the price of lumber showed one of the most marked increases and in view of the great dependency of the paper and pulp industry upon it, we ought not to be surprised at the sharp rise in their indices of pecuniary volume of production with the consequence that the workers in these two industries received in 1920, the smallest share of the market valuation of the products of their labor.

CHART 32

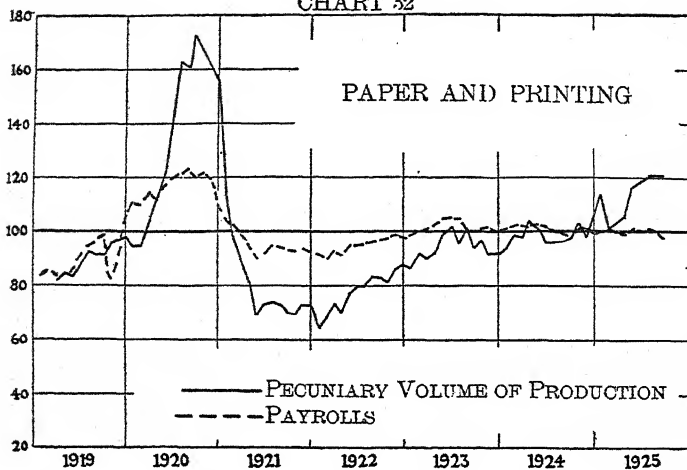


CHART 33

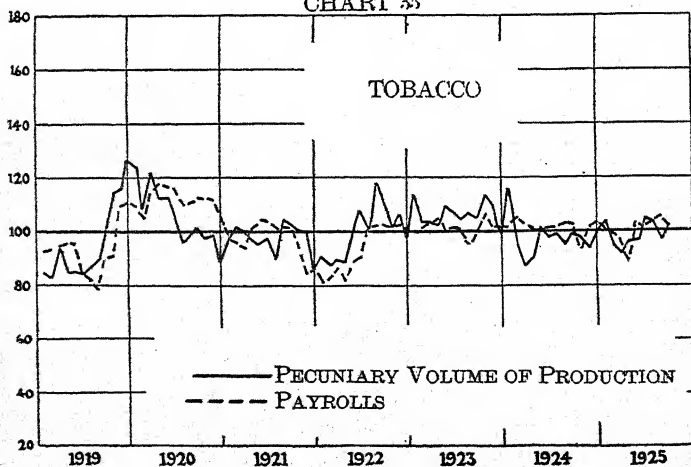


TABLE 72. PECUNIARY VOLUME OF PRODUCTION TOBACCO
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	85	124	97	91	113	116	104
February	83	109	102	88	103	94	95
March	94	122	100	90	103	87	92
April	85	113	97	89	102	90	96
May	86	113	96	102	109	101	97
June	85	109	98	103	107	97	105
July	87	96	90	101	104	99	104
August	90	99	105	118	106	95	97
September	99	102	103	110	105	99	102
October	115	98	100	102	113	98	
November	117	99	100	107	110	94	
December	127	89	87	99	100	99	

In the second cycle no such uniformity in behaviour was apparent. Broadly speaking, the movements of payrolls and output fell into two classes. We find that in industries which turn out consumers' goods, wages were on a higher level than the dollar volume of output during almost the whole of 1923 and 1924, when each of these indices was measured from its respective base line. Such was the case with industries producing leather and shoes, cottons, woolens, and paper and printing. The opposite was true of industries supplying chiefly producers' goods, such as iron and steel and lumber. The greater fluctuation of both output and prices in the latter group of industries affords, perhaps, the chief explanation for the differences noted in the movements of the two groups.

But may not the dissimilarity in the behaviour of the wage and output series in the two cycles be due to the methods of adjusting the series that we have employed? Does not adjustment for secular trend by a straight-line fit, tend to bias our ordinates in downward fashion with the changes in time as represented on the abscissa?

In the first place, it should be noticed that all the series that

have been used are adjusted for secular trend and in the sense that we have used the term, all the series are "biased". Of course, the extent to which the underlying figures are pulled upwards or downwards is proportional to the size of the average monthly increment. Which is another way of saying that if the trend of the wage and output series is in the same direction but the rate of growth is different, the tail ends of the indices will have experienced the largest influence of the method of adjustment. It should be recalled that the figures for production, wages and prices used, were not the raw data, but were themselves ratios expressed in terms of the average of one year used as a base. In the first two series, the base year was 1919 and in the price series, it was 1913. When these indices were then expressed as ratios of a line of trend, the resulting ratios of ordinates to trend were differently affected in the case of the price indexes as compared with the other two. In most cases the monthly increments of payrolls and production showed a positive direction, although the size of monthly increase was somewhat smaller in the former. The movement of wholesale prices sloped in decidedly negative fashion, the average monthly decrement was about twice as large as the monthly increments of production and payrolls. If therefore, the method of adjustment tended to make the ratios of ordinate to trend smaller than the original ratios (i. e., the monthly figures expressed in terms of 1919 as bases) in the case of production and payrolls in the second half of the period of our study, it would be counteracted, so far as the construction of indices of pecuniary volume of production goes, by the upward push given in this period by the adjusted series of wholesale prices. In other words, the fact that in 1923 and 1924 the pecuniary volume of production was closer to its base line in most cases than payrolls were to their base lines, cannot be explained by the methods employed to correct the

data for trend and seasonal changes. On the other hand, the wholesale price series when adjusted, tended to push the index of pecuniary volume of production downward in the first cycle so that the resulting discrepancy would be larger if the indices were unadjusted. The proportionately greater influence on the pecuniary volume of production of the elimination of the trend in wholesale prices over the production series, is further indicated if we multiply the production indices adjusted for trend, by the monthly changes in wholesale prices expressed in terms of the average of 1919-25. The resulting indices of dollar volume of output rose to greater heights in 1920 and were on a lower level in 1923-25 than the dollar volume of output series corrected for trends.

What light does the evidence here presented throw upon those theories of business cycles which make their central thesis the inadequacy of incomes to meet the volume of output, whether the latter is interpreted in dollar volume or physical volume? The latest exposition in this country of this type of theory, is to be found in the much advertized writings of the Pollak Foundation.¹ We will briefly summarize their thesis as presented in their latest book "Profits".

The Pollak theory starts with a postulate which is called the "Annual - Production - Consumption - Equation." This declares that the rate at which goods are produced must equal the rate at which they are bought by the final consumer, if industry is to keep an evenly moving pace. It is true that for short periods, the rate of consumption may exceed or fall behind production, but the two must balance approximately within a year. Another way of saying this is that "production cannot long be increased without a proportionate increase in consumer expenditures". "This stream of money

¹ The two books of Foster and Catchings, *Money and Profits* and also H. B. Hastings, *Costs and Profits*.

from use by consumers in the purchase of new goods back to another use by consumers in the purchase of new goods, we call the 'circuit flow of money'. The rate of flow we call the 'circuit velocity of money'." But the circuit flow of money must take a specific channel. "Upon the rate of flow of money into the reservoir of personal incomes largely depends the even flow of commodities from producer to consumer and the consequent maintenance of the annual equation". For our purposes we need not go into their analysis of why the business policies of enterprise make for a deficiency of purchasing power in the hands of ultimate buyers of goods, except to point out that they deem the important problem a deficiency in the flow of funds into the hands of individual consumers.

Several ambiguities appear at important points in their presentation, which make an exact report of the authors' views sometimes difficult. Usually they speak of the flow of "money" in the narrow sense of "currency" whereas at other times they include the wide field of "credit". Then too, although they seem to stress the actual physical discrepancy between volume of money and volume of goods, and even go so far as to decry psychological explanations as primary factors, at other times they emphasize the "fear" aspect of the deficiency of incomes. That is, we are led to infer that there may not be an actual discrepancy, but the fear of such. Sometimes they even cite this "fear" as proof of an actual difference between income and goods. This shift in emphasis is shown when they are confronted with the fact that a slump in activity usually starts in centers farthest away from the retail market. They argue that this is consistent with their position, for "sometimes before consumer demand fails to match the supplies that are actually reaching retail markets, it becomes clear that the sustaining of demand on the *existing* level will not be sufficient to ab-

sorb the supplies that are already in process, in transit, and in speculative hands."

Whether or not there is any shift of emphasis at different points of their analysis, it is safe to say that at all times, they deem the change in demand for consumers' goods of crucial importance in making for the cyclical character of business fluctuations. The indices of money and real incomes which we have shown to lag behind the indices of dollar volume and physical volume of output, would seem to lend support to the thesis of Foster and Catchings. But we are in no position to determine the significance of the discrepancy between goods produced and incomes received by the consumer. We have no ground for maintaining that this discrepancy was the cause of the turn in business in the early part of 1920. For there are many institutional and psychological factors that cannot be gauged quantitatively but which are nevertheless of great importance in estimating the forces that have made for the turn of business away from prosperity.¹

Let us examine the underlying assumptions of this theory. The most important of these is that the flow of incomes to individuals is the chief source of purchasing power, or rather the one of greatest importance. This is not supported by the facts. The annual volume of money transactions is much larger than those arising from retail trade. Consumers spend dollars in the purchase of goods (and even here sales on terms of postponement of payment is of increasing importance) whereas merchants and manufacturers spend credits which are subject to greater elasticity. Book and bank credit have a wider base and are more potent factors than individual incomes in the "circuit flow of money". The flaw in the 'circuit flow of money theory is, that it is

¹ Further discussion of the effect of changes on the demand for consumers' goods upon the course of business fluctuations during the post-war period, is given at the end of Chapter IV.

a description of the *flow of money* whereas the more important thing is to examine that structure of contractual commitments known as credit. In view of these considerations it is, to say the least, unwarranted, that the "turnover of money as a whole may have less to do with business fluctuations than the turnover of money in its particular function of moving goods into the hands of consumers."

Even if we attach an importance to retail trade which the authors give, it is important to point out that the flow of individual incomes back to industry through the channels of retail trade, at any time, is less than the money expended by industry in the form of wages and salaries. One need only remember that consumers spend part of their incomes for rent, light, transportation, etc., and that they lay aside money for 'savings' which are often invested in capital goods.

That all the funds which were disbursed to consumers did not flow into retail trade is shown in the following table. This gives a comparison of the fluctuations of retail trade with the fluctuations of payrolls of factory workers in industries

TABLE 73. STANDARD DEVIATIONS OF PAYROLLS AND RETAIL SALES,
1919-25¹

PERCENTAGE DEVIATIONS FROM TREND CORRECTED FOR SEASONAL VARIATIONS

<i>Payrolls</i>		<i>Retail Sales</i>	
Knit goods	16.0		
Men's furnishings	14.9	Dry goods	11.5
Men's clothing	19.8	Dep't stores	6.3
Women's clothing	10.7	5 and 10 cent stores	5.1
Women's headwear	7.5		
Boots and shoes	9.8	Shoes	9.6
Bread and bakery	8.0		
Flour and gristmill	8.7	Groceries	10.6
Animal products	11.0		
Tobacco and products	8.6	Tobacco and cigars	7.9
Musical instruments	20.5	Music chains	11.8
Confectionery etc.	8.8	Candy	7.9

¹ S. S. Kuznets, *Cyclical Fluctuations*, p. 37.

turning out consumers' goods. In almost all cases the standard deviations of retail sales were much lower than the standard deviations of payrolls for the period 1919-25.

One point should not be overlooked in this connection, namely, that the total sales in retail trade for the year 1919 was a small fraction of the total volume of payments that took place in that year. We need not go into elaborate estimates of the total volume of payments. If we take the debits to individual accounts as given by the Federal Reserve Board, we find that the retail sales were about 8% of the total volume of payments, using Mr. L. B. Mann's¹ estimates of the value of retail sales for the year 1919 — about 35 billions of dollars. This figure of 8% is undoubtedly high, for data of debits to individual accounts were collected from about 150 of the larger clearing-house centers, in the year 1919; in 1925 these statistics embraced 258 cities and covered probably more than 90% of the checks drawn in the country. We can therefore see that the volume of payments in 1919 is considerably underestimated, and that the resulting ratio of retail sales to volume of payments should be less than 8%. But this crude and simple estimate should suffice to indicate the relatively small part that the stream of funds into retail trade plays in the total volume of payments made among business enterprises in a given year.

Further comparison might be made between payrolls and retail sales. It might be shown that so far as timing goes, the movements of payrolls, and for that matter production, precede retail trade. In other words, then, industry begins to slacken its pace at a time when the actual sales would warrant the greatest spirit of optimism. Even if the facts supported this statement, Foster and Catchings might legitimately claim that this does not tend to disprove their position that fluctuations of the kind we are dealing with are

¹ *American Economic Review*, Dec., 1923.

due to the differences that take place between goods and income under given price conditions. For production, as is obvious, is not the same as flow of goods to the market. The flow to the market may be greater than production at any time because deliveries are more rapid than output. The flow to the market may be less than current production. Furthermore goods in transit may be greater than the volume of goods being produced, but this may lead to only an increase in stocks on wholesalers' as well as retailers' shelves. Finally, goods passing into consumers' hands may be much less than is indicated by figures of production, wholesale trade, etc. If, therefore, we compare the flow of money payments or purchasing power with production, we must examine the actual flow through the channels of the distributive trades, before we can draw any legitimate inferences.

Some of the factors making for the uncertainty that prevailed, as the peak of prosperity was approaching, is brought out when one examines the reports of the weekly trade journals during this time. Let us take an exaggerated illustration of these phenomena,—the peak of 1920, let us say, in the iron and steel industry.

In March 1920, the workers in the industry were receiving wages at almost peak level. At that time producers became hesitant in many quarters about "future prospects" a hesitancy which was bound up with the judgment that the commitments made, if actually delivered, would have to be absorbed by the consumer, in volume and rate, equal to the maximum capacity to which the industrial machine was at that time geared. It seems that it was not so much an estimate by business men, that current buying power was not capable of adequately meeting current production, but the fear that the lags between orders and production and transportation, complicated by the lags between prices in the different markets through which the goods had to go before they passed

into the hands of consumers, further complicated by the lags in the disbursement of incomes and the desire and capacity to spend them, made for this spirit of caution on the part of those whose business it is to determine rates of activity.

By way of summary criticism of Foster and Catchings' theory,¹ the following may be said: Our chief criticism is that they exaggerate the role which personal incomes play in our money economy to the neglect of the much more significant volume of purchasing power that passes annually among business enterprises. Nevertheless the fact remains that the value of output and volume of output fluctuated within a wider range than payrolls or real incomes. We are in no position to dogmatize upon the importance of

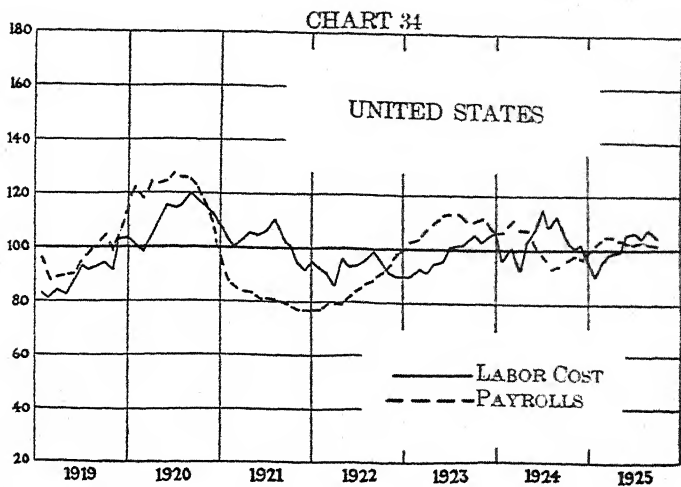
¹ We cannot overlook the statistical data which these writers marshal in support of their thesis. Despite the fact that they confess that present statistics are inadequate to give a real test of their propositions, the data which they use are aimed to give the impression that business fluctuations are due to the inadequacy of consumers' incomes. The captions of the paragraphs are indicative of this. "Income Statistics Show Inadequacy of Consumer Demand"; "Indexes of Production and Distribution Tell the Same Story". In their more cautious moments, however, they declare that "from these statistics, it is true, we cannot tell whether the reduced income caused the depression or the depression caused the reduced income."

On a number of occasions they fail to draw the inferences which their charts would warrant. To take only two instances: on page 385 of "Profits", they compare an index of productive activity with a so-called index of distribution to consumers. This shows the discrepancy between the two to be much greater in the second cycle than the first; the conclusion that should follow is, that depression should have been much more severe in the second cycle. The same thing is true of the diagram on top of page 386. Here we have a comparison of the volume of trade with the total volume of production, the shaded area showing that in the period 1922-24, the volume of trade did not reach the heights of production; in the period 1919-20 the chart shows the opposite condition—volume of trade exceeding production. We should conclude from this that in the first cycle, distribution was at least keeping pace with production. From this we ought to infer that no period of depression should have followed—which, of course, is directly contradictory of the true state of affairs.

these variations. The discussion points to one thing, however, the necessity for information upon the lags between orders given and the filling of them; between prices of goods passing through different markets; between payments and deliveries by business firms, and finally, the lags between receipt of incomes by consumers and all of these phenomena. That more precise evidence on these issues is obtainable, can hardly be doubted. The lack of data on these points is due to the tardy recognition of these phases of the problems of cyclical phenomena.

Those who seek to explain cyclical phenomena by noting the effect of the changes in the disbursement of incomes upon the power of the consumer to buy the things he produces, usually fail to trace the effect of this distribution of wages upon the business enterprises that give out these money incomes. The latter is as interesting and probably a more fruitful path of inquiry. Furthermore, it prevents the theorist from neglecting an important and convenient approach, namely, an examination of the movements of production, prices and wages, etc., as they affect the prospects of profits of business enterprise. A thoroughgoing analysis of the changes in these manifold factors would take us far afield. They are fully treated in Wesley C. Mitchell's "Business Cycles". We shall confine ourselves to pay-rolls as an important element of cost.

We have two sets of figures for manufacturing establishments, monthly changes in wages given out and monthly changes in production. Each of these is corrected for secular trend and seasonal changes. If we divide the former by the latter, we will obtain the fluctuations in the relative labor cost per unit of output for each month. The appendix gives more information with regard to these ratios of pay-rolls to production, or what we choose to call labor-cost indexes.



Tables 74-81 and Charts 34-37 reveal the cyclical character of labor cost in the various branches of manufacturing industries in the United States. Let us compare the behaviour of these indices in the different phases of the cycle. The puzzling aspect which some of them assume is brought out when we measure their fluctuations by subtracting the number of points between the lowest and highest indexes (or vice versa) in the different phases of the cycle. When we subtract the lowest index number in 1919 from the peak month of the first cycle, we find that the greatest rise in labor cost per unit of output was shown by cottons (rising 76 points) followed closely by wool, and then by paper and pulp; iron and steel ranked next to the lowest (rising 46 points), the lowest being lumber which rose only 15 points. On the upward swing of the second cycle, there was to a large extent a reversal in these positions. Iron and steel outranked the others in the rise of its labor-cost index; it was followed by cottons. Lumber, paper and pulp and leather showed an almost identical rise, and the lowest swing upwards was experienced by woollens. As a whole, the comparative rise in labor cost was smaller in the second than in the first cycle.

Do we find a greater consistency in the relative decline of these indices in the two cycles? Iron and steel showed the greatest fall in both periods. In the first cycle, it was followed by cottons, paper and pulp and leather. Wool and lumber experienced the least decline. In the second cycle, cotton, lumber and leather followed iron and steel. Wool and paper and pulp exhibited the least decline. It is safe to conclude then, that the amplitude of fluctuation of labor cost in the first cycle was greater than the second.

It is much easier to explain the differences in the size of the fluctuations of the two cycles, than it is to account for the differences in the behaviour of each of the individual series.

One need refer to only one aspect, namely, that the hectic character of the 1919-21 cycle made for a lower efficiency on the part of labor as well as management than was true of the much milder cycle of 1922-24.

We hesitate to offer an explanation of the differences among the labor-cost indices of the various branches of industries, not merely because of the apparent lack of consistency in their conduct, but primarily because of the uncertainty of the facts. These indices are subject to greater monthly fluctuations than is the case with either of the production or payroll series. The freakish character of some of the monthly changes are probably due to imperfections in the elimination of the seasonal indices from the components of the series which form the ratios which we have chosen to call labor-cost indices. Furthermore, these ratios are influenced by the vagaries in the movements of each of two indices, and since it is very unlikely that the exaggerations of one index would be compensated by the behaviour of the other—the index of labor cost registers any capricious influence to which its constituents may be subject.

It is a safe inference to make, despite the shortcomings of these indices, that it is somewhat misleading to use the disbursement of payrolls by factories as an indicator of the changes in cost of labor to these establishments. Comparisons of the indices of payrolls and labor cost show a number of differences.

In all cases, the cost of labor lags behind the changes in the movements of payrolls by about three to six months. In other words, for a number of months after factories have begun to reduce their weekly wage bill, the paradox appears of cost per unit of labor continuing to rise. Then too, the decline in labor cost is much slower than the reduction of payrolls disbursed. In the second cycle, when payrolls were at their lowest in 1924, labor cost was at a maximum. Let us examine a few cases among the individual series.

In iron and steel, labor cost per unit of output rose in the first cycle with the increase of payrolls, although the percentage increase was less in the former series. The peak of high labor cost continued for about six months after payrolls began to decline. In fact, labor cost was highest when employment and wages paid were at their lowest. Nor did it fall as low in depression. On the upward movement of the second cycle it lagged behind once more and it was at a maximum about six months after payrolls had declined and were at their lowest. In cottons, we find that labor cost and wages moved much more closely than was true of the corresponding indices in iron and steel. In lumber the lag between payrolls and labor cost was distinctly evident.

Why do the indices of labor cost lag behind payrolls? The explanation is bound up with the fact that production increases faster than payrolls in revival, and declines sooner in prosperity. It is not difficult to see the reason. As business begins its upward swing most enterprises operate with a picked force that remained after the weaker members of their organizations were weeded out during the preceding phase of depression. Then too, in the early stages of revival, management is comparatively more efficient because of greater emphasis upon low costs to meet the very active competition for the relatively limited amount of business available at this time. Towards the peak of prosperity, however, the physical output per laborer is likely to decline because of the new and inexperienced hands added to the labor force and the strain on the efficiency of management which is often incapable of coping with a situation in which demand is often in excess of the plant's capacity. At the same time, payrolls are increasing because of the rise in wage rates as well as extra pay for overtime. Thus at the very time production begins to sag, payrolls keep on increasing with the result that the ratios of payrolls to production increase.

TABLE 74. LABOR COST INDEX UNITED STATES
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	83	101	103	93	90	97	91
February	81	98	100	91	93	101	96
March	84	104	103	86	92	93	99
April	83	110	106	96	95	104	100
May	88	115	105	93	96	107	106
June	93	115	106	94	101	113	107
July	92	116	111	96	102	109	105
August	93	120	104	99	103	112	108
September	94	117	101	96	106	104	105
October	92	115	95	91	104	101	
November	103	113	92	90	105	102	
December	104	108	95	90	107	97	

TABLE 75. LABOR COST INDEX IRON AND STEEL
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	92	98	97	68	77	97	91
February	85	96	95	57	78	90	86
March	89	101	116	56	77	93	92
April	104	120	124	64	83	115	107
May	111	111	120	65	84	137	114
June	101	114	121	72	97	140	113
July	97	117	133	76	97	145	116
August	102	113	105	94	101	125	111
September	110	116	89	89	107	110	103
October	107	124	86	87	114	116	
November	96	133	85	90	120	114	
December	100	121	90	90	118	103	

In depression, since total volume of production reaches lower depths than payrolls, the labor cost per unit of output does not fall as low as wages. The greater decline in production than in payrolls is due largely to the resistance of the working force to reductions proportional to the decline in output. Labor organizations play an important part in keeping up the wage scale. Furthermore, the most efficient help is kept on the payrolls and their wages are relatively

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TABLE 76. LABOR COST INDEX COTTON GOODS
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

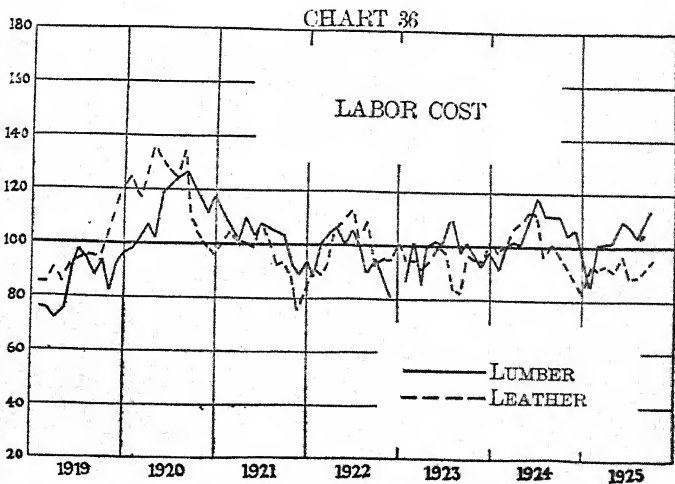
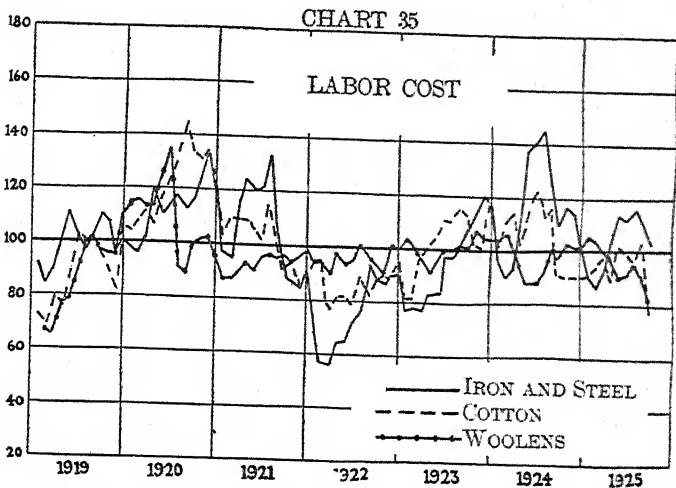
	1919	1920	1921	1922	1923	1924	1925
January	73	104	103	95	82	102	91
February	69	107	110	95	82	111	93
March	80	112	110	77	97	115	98
April	76	106	110	82	101	103	89
May	90	117	108	82	105	116	102
June	103	123	102	79	112	123	100
July	100	131	115	89	121	113	96
August	102	145	100	83	116	117	104
September	95	134	92	88	113	91	77
October	89	131	94	90	103	90	
November	82	134	86	89	100	90	
December	106	121	90	95	118	90	

TABLE 77. LABOR COST INDEX WOOLEN GOODS
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	101	115	88	94	104	105	106
February	68	116	88	95	100	107	104
March	66	114	90	90	97	100	100
April	78	114	94	98	92	93	98
May	79	125	91	94	97	88	90
June	90	136	96	96	100	88	91
July	100	92	97	101	100	92	95
August	101	89	96	97	102	101	91
September	97	99	97	94	101	97	82
October	96	102	95	91	108	103	
November	96	103	96	101	106	101	
December	111	95	99	100	105	102	

higher than that of unskilled workers. Other facts might be mentioned. But what is the significance of these facts?

In revival and prosperity, when cost of labor lags behind not only payrolls, but prices, profits are increasing. The slow movement upward of the labor cost per unit of output, tends to exaggerate the margins between costs and selling price, and in this way it gives prosperity an added momentum. On the other hand, the fact that labor cost continues



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TABLE 78. LABOR COST INDEX LEATHER
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	86	125	101	91	95	98	93
February	86	117	105	89	95	100	92
March	93	118	101	95	92	107	94
April	84	137	101	106	95	109	91
May	93	132	99	111	100	113	97
June	94	127	109	113	98	113	89
July	95	124	103	103	84	96	89
August	96	134	93	110	83	101	92
September	94	108	94	93	97	97	98
October	103	101	89	96	96	94	
November	112	99	76	95	95	89	
December	121	95	83	100	102	82	

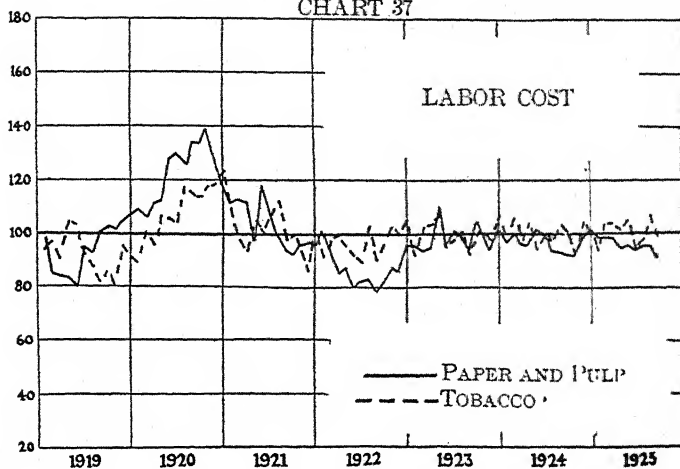
TABLE 79. LABOR COST INDEX LUMBER
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	76	98	112	86	87	91	86
February	76	101	106	101	101	100	101
March	72	107	102	105	86	102	102
April	75	103	110	107	100	101	103
May	92	119	104	100	102	108	110
June	98	122	108	106	101	118	109
July	95	125	107	102	111	112	104
August	88	127	105	90	98	112	109
September	94	122	104	95	101	112	114
October	83	118	92	89	94	105	
November	93	112	87	81	93	107	
December	98	117	94		98	100	

to rise after payrolls have begun to decline, tends to hasten the downward movement of the cycle. Manufacturers, operating at a maximum labor cost will, with the turn of prosperity, reduce the number of their employees to an extent greater than would be indicated by the underlying business conditions.

There are two ways then, of denoting the effect of payrolls upon the profits of business enterprise. The first, as

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TABLE 80. LABOR COST INDEX PAPER AND PULP
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	98	110	112	101	96	97	99
February	85	107	113	95	94	100	99
March	84	112	112	85	95	96	99
April	84	113	98	87	111	96	95
May	80	128	118	80	97	102	96
June	95	130	108	82	102	99	94
July	93	126	100	83	100	95	96
August	100	134	94	78	94	95	96
September	103	134	93	83	105	94	90
October	102	139	96	87	98	93	
November	105	130	97	86	95	99	
December	108	118	96	96	102	101	

TABLE 81. LABOR COST INDEX TOBACCO
ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1919	1920	1921	1922	1923	1924	1925
January	94	90	105	91	92	99	94
February	97	102	98	98	103	107	102
March	90	96	94	100	104	98	103
April	105	107	106	95	108	105	91
May	104	106	100	92	96	95	105
June	93	104	108	89	99	100	94
July	88	118	113	104	102	98	98
August	82	115	98	89	93	104	107
September	86	114	100	96	101	100	98
October	81	118	94	103	100	92	
November	96	118	86	100	98	105	
December	91	124	102	105	108	101	

we have seen, is to take the ratios of the value of output to payrolls; in other words, the monthly values of output divided by the total wage bill month by month throughout the period 1919-25. Or we may indicate the labor cost per unit of output by dividing the total wages by the total production for each month. Both methods may be used to supplement each other.¹

¹ One method is not, however, merely the inverse of the other. In the

STATISTICAL APPENDIX

Index of Production, United States: Total index of manufacturing production given in the Federal Reserve Bulletin, March 1924, page 188. Corrected for secular trend by straight-line fit, and the method of link relatives used for seasonal element. Unless stated to the contrary, the same method used in all the other production series.

Index of Pecuniary Volume of Production—United States: The above index was multiplied by the U. S. Bureau of Labor Statistics Wholesale Price Index of All Commodities as well as wholesale prices of consumers goods (199 commodities prepared by the Federal Reserve Board), after each of the price series was expressed in terms of a straight-line fit. The adjustment was made in the case of all other wholesale price series. In these two cases the same lags were used; they were as follows: Jan. 1919-Aug. 3 mos.; Aug. 1919-July 1920 4 mos.; Aug. and Sept. 3 mos.; Oct. 1920-May 1922 2 mos.; July through Sept. 3 mos.; From Oct. 1922 to the end of the period of our study, 4 months.

Labor Cost Index—United States: Payrolls of manufacturing establishments in the United States divided by the index of manufacturing production.

Index of Production-Iron and Steel: This is made up of the monthly figures of pig-iron production supplied by the Iron Age, and steel-ingot production given out by the American Iron and Steel Institute. The combined index is pub-

first case, when we divide the total value of output by total wages, we get an approximation of the value of the product created for each dollar expended on labor. In the second case labor cost is obtained by dividing payrolls by output. This measures the wages paid for each unit of output. This is the inverse of $\frac{\text{output}}{\text{wages}}$ or the number of physical units created for each dollar paid to labor. In short the first method furnishes a *market valuation* of the services of labor; the second method furnishes a *physical valuation* of the services of labor to enterprise.

lished by the F. R. Bulletin, Mar. 1924 and succeeding issues under the caption "Index of Industrial Activity". The seasonal indexes used were those given in the Dec. 1922 issue of F. R. B.

Index of Pecuniary Volume of Production—Iron and Steel: The above multiplied by wholesale price index of "Iron and Steel". The lags varied as follows: Jan.-July 1919, 3 mos.; Aug 1919-Oct. 1920, 4; Nov. 1920-May 1922, 2; June 1922-Dec. 1922, 3; Jan. 1923-Mar. 1924, 4; Apr. and May, 3; and for the remainder of the period, 2 months.

Labor Cost Index—Iron and Steel: Payrolls of iron and steel (crude and intermediate) divided by same index of production used in the previous two paragraphs.

Index of Production—Textiles: This includes indexes of cotton, wool and silk. More specific information is given in the Mar. 1924 F. R. Bulletin.

Index of Pecuniary Volume of Production—Cottons: No combined wholesale price index of textiles is available. The nearest is that of cloths and clothing group, which includes boots and shoes, cotton goods, woolens and silks. We therefore used the wholesale prices of cottons which was multiplied with the index of cotton goods production given in the F. R. B. in its index of 22 basic commodities. This production index is corrected for seasonal element; the secular trend was eliminated by method that we have used throughout. In all cases where the series of production is taken from the F. R. Boards index of 22 basic commodities, the same procedure was used. The lags varied as follows: Jan.-Aug. 1919, 3; Aug. 1919-July 1920, 4; Sept. and Oct., 3; Nov. 1920-May 1922, 2; July-Aug., 3; Sept. to remainder of the period 4 months.

Index of Pecuniary Volume of Production—Woolens: Wholesale price of woolens multiplied by index of production of woolens which was constructed similarly to cottons. Fol-

lowing lags used: Jan.-Aug. 1919, 3; Sept.-June 1920, 4 mos.; July 1920-May 1922, 2; June-Aug., 3; Sept. 1922 to remainder, 4 months.

Labor Cost Index—Cottons: Payrolls of cotton manufacturing divided by the same index of production used in pecuniary volume of production.

Labor Cost Index—Woolens: Payrolls of woolen manufacturing divided by index of production of woolens used above.

Index of Production—Leather and Shoes: This includes sole leather, upper leather, each given a weight of 1, and boots and shoes given a weight of 3. The combined index as given in the F. R. B. Mar. 1924 was adjusted for secular trend and seasonal elements.

Index of Pecuniary Volume of Production—Leather and Shoes: The wholesale price used is a combination of three price series—sole oak-scoured backs, upper leather chrome "B" grade, and boots and shoes. The first two were each given a weight of 1, and the last of 3. The production index used is given in the previous paragraph. The following were the lags: Jan.-August 1919, 3; Sept. 1919-July 1920, 4; Aug.-Oct., 3; Nov. 1920-Sept. 1922, 2; Oct. 1922-Dec. 1923, 3; and for the remainder of the period, 2 months.

Labor Cost Index—Leather: The payrolls for leather and products were divided by index of production of sole leather included in the F. R. Board's index of 22 basic commodities.

Index of Production—Lumber: Figures for Lumber cut as published by the National Lumber Manufacturers Association and given in the F. R. B. under the index of 22 basic commodities.

Index of Pecuniary Volume of Production—Lumber: Previous index of production multiplied by wholesale price of lumber allowing for a fixed lag of two months.

Labor Cost Index—Lumber: Payrolls of Lumber and Products divided by index of production given previously.

Index of Production—Cement and Bricks: given in F. R. Bulletin, Mar. 1924.

Index of Production—Paper and Printing: same and also Aug. 1925 issue.

Index of Pecuniary Volume of Production—Paper and Printing: Previous index multiplied by wholesale prices of paper and pulp. A lag of two months up to Nov. 1920, and thereafter a one-month lag used.

Labor Cost Index—Paper and Pulp: Payrolls of Paper and Pulp divided by the Index of Newsprint production included in the F. R. Board's index of 22 basic commodities.

Index of Production—Food Products: This includes animals slaughtered, wheat-flour production, sugar and oleomargarine. See F. R. B. Mar. 1924.

Index of Pecuniary Volume of Production—Food Products: Previous index multiplied by wholesale price of all foods allowing for no lag.

Index of Production—Tobacco: F. R. B. Mar. 1924. Seasonal index used was an average of the seasonal indices of three different series—cigars, cigarettes and manufactured tobacco as given in the F. R. B. Dec. 1922.

Index of Pecuniary Volume of Production—Tobacco: The wholesale price used was an average of plug tobacco and smoking, granulated, 1-ounce bags; the former was given a weight of one, the latter of two. No allowance made for lag.

Labor Cost Index—Tobacco: Payrolls of tobacco and products divided by previous index.

CHAPTER IV

AN ANALYSIS OF THE FLOW OF PURCHASING POWER AS A CAUSAL FACTOR IN THE COURSE OF THE POST-WAR BUSINESS CYCLES

WE have restricted our study to the fluctuations of workers' incomes paid out by manufacturing establishments. The relative importance of these wages in the total flow of weekly or monthly receipts of those who are usually grouped in the category of "working class", was not indicated. Furthermore, the proportion of these incomes to the other groups of personal incomes available for consumption has not been estimated. Salaries as distinct from wages, interest, dividends, rents, profits from manufacturing, form a large part of the flow that can be returned to industry through the channels of retail trade. In comparing the movements of goods, prices and incomes, we have to examine these other sources of purchasing power.

What proportion of the total number of wage earners is attached to manufacturing establishments? Estimates have been made during the past few years by Hansen, Hookstadt, King, Leven, and Wolman. The differences in their final calculations are due to differences of definition of occupational status. For our purpose the estimates of King and Leven will suffice. In the National Bureau of Economic Research publication called, "Income in the Various States", they separate salaried employees from wage workers. The following table indicates the proportion of all wage earners who were estimated to be attached to the different industries

in the United States for the year 1919. The calculations are based on Table C page 23 of the above mentioned volume :

TABLE 82

PROPORTION OF WAGE-EARNERS ATTACHED TO INDUSTRY IN THE U. S. 1919

Agriculture	11.1%
Mines, Quarries and Oil Wells	4.9
Manufacturing	43.5
Construction	4.8
Transportation	11.5
Mercantile	11.5
Unclassified	12.9

NOTE:—Employees grouped under “government and banking” not being separated according to wage or salaried class have been excluded. They formed about 14% of all employees for that year.

The division between salaried employees and wage workers was “drawn on the same lines as those laid down by the Bureau of the Census: that is the managerial staff, the office workers and those having relatively high security of tenure are usually counted as salaried, while the remaining employees are classed as wage workers.” About two-fifths of wage earners in all industries are engaged in manufacturing; about one-tenth are engaged in each of the following; agriculture, transportation and mercantile lines, and about one-twentieth in mining and construction respectively. Salaried and wage workers together form approximately three-quarters of all that are gainfully employed, the other quarter comprising the total number of entrepreneurs, the largest class of which is to be found in agriculture (three-fifths of all entrepreneurs).

What proportion of the money receipts that are obtained by employees is received by each of the above-mentioned sub-groups of employees? In these estimates no distinction is made between wages and salaries. The following table gives the proportion of the total amount of wages and salaries paid by the various branches of industry, using the average of

1909-1918 in each case.¹ To the right is given the proportion paid out in 1919.²

TABLE 83

PROPORTION OF TOTAL WAGES PAID BY VARIOUS BRANCHES OF INDUSTRY

	1909-18	1919
Agriculture	4.11%	4.3
Mining	4.10	4.0
Factories	33.05	39.2
Constructions	5.26	3.8
Other hand trade	2.14	
Railways	7.41	
Street and electric railways	1.08	Trade, transportation, and
Government	9.13	miscellaneous industries .. 48.6
Unclassified	30.30	

Although estimates for Express, Pullman, Co.; Electric Light and Power, Telegraphs and Telephones, Transportation by water, and Banking are given, ratios were not calculated.

These tables indicate that factories pay out at the most two-fifths of all wages and salaries given out to all employees; that mining, construction and transportation together pay out about a maximum of one-fifth of wages and salaries received by all employees.

What was the character of the cyclical fluctuations of incomes of wage-earners other than factory workers? Monthly data of the type of employment and payrolls of manufacturing establishments are lacking for most of these groups. Up to and including 1922, the U. S. Department of Agriculture has published an average yearly figure of wage-rates per month with and without board for hired farm labor. Since 1923 quotations are given quarterly. In mining,—monthly changes in employment and payrolls of about 90 bituminous coal mines were given out from 1919 to

¹ *National Bureau of Economic Research, Income in U. S.*, vol. ii, p. 242.

² *National Bureau of Economic Research, Income in the Various States*, vol. vii, p. 112.

1922; since then they have been discontinued. The Anthracite Bureau of Information has released monthly figures of employment in anthracite mines since the latter part of 1921. For information with regard to the changes in the relative economic status of workers attached to the construction industry, we must have recourse to data on wage rates. Monthly indices of union rates of wages in the building trades are published by the National Association of Builders Exchanges since 1921. In the transportation industry we have monthly data of employment and payrolls for workers on class 1 steam railroads since 1921. In 1920 quarterly data were at hand and in earlier years only annual figures were available. In mercantile lines materials indicating changes in employment of workers in retail and wholesale establishments have been gathered by a few state bureaus of labor. For data on clerical workers, we have the average weekly earnings of office employees in representative New York State Factories given out annually by the New York State Department of Labor. For government employees such as teachers, average annual salaries are given by the National Education Association. The National Industrial Conference Board also publishes from time to time special studies on a number of these groups.

This list is incomplete, but it serves to indicate the sketchy character of the information available for our purpose. We must resort to other studies for light on the comparative magnitude of the cyclical changes in the money receipts of workers other than factory labor. The publications of the National Bureau of Economic Research are particularly helpful in this direction, especially for the first cycle. We have converted the annual estimates of wages and salaries disbursed for the years 1919, 1920 and 1921 into indexes with 1919 as a base. The following are the results:

TABLE 84

INDICES OF WAGES AND SALARIES DISBURSED, 1919-1921

	1919	1920	1921
All industries	100	119.5	99.8
Agriculture	100	111.5	94.4
Mining	100	131.3	91.1
Manufacturing	100	127.5	81.3
Construction	100	98.2	78.4
Trade, transportation, and miscellaneous	100	114.5	117.8

From this table we see that the largest relative increase in wages and salaries in the peak year of 1920 was received by workers in mining and manufacturing. The fact that mining showed the greatest increase in 1920 as compared with 1919, is not due solely to the coal strike in the latter year, but largely to the fact that mining continued at its height of activity almost until the end of 1920. The earlier decline of activity in building industry is largely reflected in the fact that wages and salaries were 2% less in 1920 than 1919. In the depression year 1921, the greatest decline was shown by factory labor followed by mining. The index for the last group, trade, transportation etc., gives us no light because of the undifferentiated classification.

W. I. King's study of "Employment Hours and Earnings in Prosperity and Depression" is perhaps the most valuable account of the effect of the first cycle upon the various classes of wage earners. This is an investigation based on a questionnaire, of which somewhat over 9000 complete reports were received; the employers responding to this inquiry engaging over 3,000,000 people. It covered the period from the first quarter of 1920 to the first quarter of 1922. The following table gives the maximum cyclical decline of wages and salaries paid to employees:

TABLE 85. MAXIMUM CYCLICAL DECLINE OF TOTAL WAGES
AND SALARIES ¹

PERCENT	
All industries	23.16
Agriculture	19.25
Extraction of minerals	36.31
Building and construction	24.54
Finance	5.20
Public and professional service	4.27
Domestic and personal service	8.15
All transportation	28.11
Steam railways	36.72
Other transportation	7.27
Commerce and trade	5.41
Wholesale	17.75
Retail	4.74
All factories	37.60

Once more we see that the greatest cyclical decline of monetary receipts was found among factory workers, followed by those attached to steam railroads, mining and construction work, and agriculture. The least decline of incomes disbursed was shown by the following groups; finance, commerce and trade, and domestic and personal service. Most of these groups reached the peak of 1920 in the third quarter of the year and so far as this investigation goes, reached their lowest point in the payment of incomes to employees in the first quarter of 1922, the only exception being the building industry which reached its lowest point in the first quarter of 1921.

The cyclical fluctuations of the incomes of one of these groups are given below. The first table gives the payrolls of class I railroad employees.

¹ W. I. King, *Employment Hours and Earnings in Prosperity and Depression*, p. 104.

TABLE 86. PAYROLLS RAILROAD WORKERS

ADJUSTED FOR SECULAR TREND AND SEASONAL VARIATIONS

	1920	1921	1922	1923	1924	1925
January			83	101	97	99
February	108	102	78	93	93	90
March			87	104	98	96
April			82	100	96	95
May	122	94	87	106	97	96
June			90	105	93	97
July		86	58	106	96	100
August	142	92	82	110	97	100
September		90	96	104	97	99
October		96	104	110	104	104
November	133	91	101	101	96	98
December		86	100	95	97	99

We shall now indicate the relation of wages and salaries to the total income. In their estimates of the national income, the National Bureau of Economic Research make a distinction between the current income and the total net income. To get the *current income* they add together the following items: "wages, salaries and pensions; profits withdrawn from business; dividends, interest and rent received by individuals; the rental value of homes occupied by their owners; interest upon sums invested in household furnishings, clothing and the like, and the value of commodities which families produce for their own consumption." To get the *total net income*, they add to the current income the "surpluses and gains on inventories accruing to individuals". This last item is obviously useless for our purposes. In fact, some of the items included in the first concept of income are of no importance to us. For we are concerned with income that is available for personal expenditure. Nevertheless, the proportion of the current income attributed to wages and salaries is the best approximation we have of the money incomes available for expenditures by the employee class. The same is not true of property and

entrepreneurial income. This last group includes the following items: incomes of farmers, incomes of other entrepreneurs from non-corporate enterprises, interest, dividends and rents received by individuals, and gains on inventory values. If we exclude gains on inventory values, and take the average for the three years 1919, 1920, 1921, of the ratios of entrepreneurial and property income to the current income, we obtain an approximate figure of $2/5$ ths or 40%. For the same period wages and salaries form 55% of the current income, and miscellaneous income which includes all the remaining items of the current income makes up the other 5%. As already suggested it must not be thought that the two larger ratios indicate the relative purchasing power in the hands of employees as compared with those who receive income from investments or operation of business enterprises. For it must be remembered that a large proportion of the share of "management and property" is in the form of claims on enterprises and is not given to the legal owner in the form available for spending. The following table indicates the fluctuations of entrepreneurial and property income both in absolute estimates and in the form of indices with 1919 as the base year.

TABLE 87

FLUCTUATIONS OF ENTREPRENEURIAL AND PROPERTY INCOME, 1919-1921

	1919		1920		1921
	(000 omitted)		(000 omitted)		(000 omitted)
Farmers' income	9,589,256 100		7,323,885 76.3		3,964,736 41.3
Business income					
(other than farmers)	8,116,405 100		8,326,405 102.5		7,720,362 95.1
Interest	2,816,862 100		2,951,726 104.7		3,027,093 107.4
Dividends	3,579,765 100		3,617,900 101.0		2,965,968 82.8
Rent (residential) . .	1,587,000 100		1,922,000 121.0		2,347,000 148.0

¹ *National Bureau of Economic Research, Income in the Various States, vol. vii, p. 28.*

The farmers were the worst sufferers in the depression of 1921, the recipients of dividends and business income were the second largest group to suffer. The item of dividends seems to be questionable in the light of other data. The statistics of income given out by the Bureau of Internal Revenue shows a gain in dividends for 1921 as compared with 1919. Then too, the monthly disbursements of interest and dividends given out by the Journal of Commerce indicates a much more even course in the payment of dividends. Incomes in the form of interest and rent appeared to increase throughout the period.

Let us now examine the course of the two post-war business cycles in terms of the changes in the money receipts of consumers. We have seen that among manufacturing establishments, post-war activity started in mills supplying articles of wear. Production of textiles, leather and products, furniture and other household goods, began to increase in the beginning of the second quarter of 1919. In some cases recovery took place one or two months earlier. Retail trade began to show sure signs of lively business at the same time. From what source did this purchasing power come? It is not likely that the flow of purchasing power received a large impetus from the industries producing consumers' goods, for increased employment and with it larger weekly pay envelopes had just begun. Then, too, these workers form at the most, one-half of those attached to manufacturing establishments or about 15% of wage earners in the United States. Although on the one hand, a substantial source of buying power was to be found among the farming population whose prosperity was marked during this period, on the other hand, retail trade began to

recover before those attached to the construction industry, mining, iron and steel and the railroads were being employed in increasing volume. It is very likely, then, that these increased purchases were sustained largely by a release of savings as well as government disbursements, particularly funds paid out to demobilized soldiers.

With this initial flow of purchasing power once begun, the industrial machine assumed tremendous proportions. What was the role of consumers' incomes in these movements? Once the flow of purchasing power began to increase in one group of industries, activity was resumed in other directions. The building industry which sought to make up the shortages that resulted from war exigencies, began to revive soon after the increasing movements in the textile industry. Then followed iron and steel which supplied the equipment and machinery for these expanding industries, and mining which furnished the fuel for all of them, and then the railroads which carried these materials to their appropriate destinations. All of this meant fresh sources of purchasing power with increased purchases in retail stores and a highly active wholesale trade clamoring for early deliveries of merchandise. Mills soon began to fall behind in deliveries particularly, manufacturers of equipment. Prices rose at marked rates, the degree of rise depending primarily upon the nearness of the industry to the source of raw materials. The banking situation was such as to make credit cheap and easily available. In almost all quarters there prevailed a spirit of optimism and speculation.

It is very unlikely that this process of cumulative growth which characterizes a period of prosperity receives its chief force from the direction of the flow of incomes to consumers. Larger purchases in retail stores may be the initial factor in starting the "cumulative process" of development, but the momentum of the latter continues in a fashion which is

largely independent of its initial impetus. We need only mention a few of the elements that enter into this process of change to indicate that our industrial machine moves forward at a pace that is not set to the tune of incomes received by those who have a recognized claim to the net value product of industry.

In his study of cyclical fluctuations of retail and wholesale trade, Dr. Simon S. Kuznets¹ has developed the point that the further removed a business unit is from the consumer, the greater likelihood is there that the volume of its orders for goods will exceed the volume of orders given to the business unit below it when these establishments are ranked according to their distance from the ultimate consumer. In other words, an initial force making for brighter prospects in retail lines, will cause the retailer to increase his orders to a greater extent than orders given to him; and wholesalers to give a greater volume of orders to manufacturers than is given by retailers to wholesalers. Then too, the hypothesis stressed by Prof. J. M. Clark² notes a similar difference in manufacturing output. Those turning out equipment goods are subject to greater variability in volume of business than are those producing goods of more direct consumption, primarily because the demand for new construction fluctuates with the *rate* of change in the demand for consumers goods rather than with the *absolute* change in the demand for the latter goods. When to these considerations we add the fact that profits are increasing and optimism is spreading from one group of business men to other groups; that banks are being liberal with their credit; that the spread of prices among different classes of goods which are a consequence of all these factors and in turn act as a further catalytic agent to each of the others,

¹ S. S. Kuznets, *Cyclical Fluctuations*, chap. iv.

² J. M. Clark, *The Economics of Overhead Costs*, chap. 19.

we can see that the character of the growth of revival and prosperity is dependent on causes other than the flow of money incomes. It is true that in the process, greater amounts of funds are distributed, which reinforce these upward movements, but these are mainly a resultant of the "cumulative" development of the other elements.

We now reach the heart of the problem of the significance of the disbursements of incomes in the business cycle. Did these very forces we mentioned above, finally work out in such fashion as to make the dollar value of goods increase to a greater degree than the flow of incomes into the pockets of consumers? If such was the case, was the resulting difficulty sufficiently serious nature to make for a downward swing in the business rhythm? Or were there other factors that counteracted the force of this one? Or did the role which these other factors assume relegate the force of consumers' incomes to a position of minor influence?

How shall we go about the task of finally determining the relative importance of the changes in consumers' incomes in bringing about the strains and stresses that usually set in towards the peak of prosperity? With all the quantitative data that are available at present, we are not in the position to give a conclusive test to this question for there are a number of elements that are not altogether amenable to quantitative treatment.

Nevertheless what inferences can we legitimately draw from the data that are pertinent to this question? Figures of production, prices, retail sales and money incomes are our chief sources of information. The Harvard Review of Economic Statistics publishes an index of production of "Basic Commodities" and of "Consumption Goods", each of which is corrected for secular trend and seasonal variations. The Federal Reserve Bank of New York also publishes in connection with its index of volume of trade two series that are

pertinent, one the production of consumers' goods, the other of producers' goods, each corrected for secular trend (nothing being said of seasonal elements). In both sets of indices, production of consumers' goods began to decline before the production of commodities of more primary character in the two cycles. Payrolls in manufacturing establishments turning out consumers' goods began to decline sooner than was the case with the payrolls in the majority of industries turning out capital goods. Although the dollar volume of retail sales began to decline about the middle of 1920, the rise in sales was checked several months before. The dollar volume of sales by wholesalers reached their peak in Dec. 1919-Jan. 1920 and then began to decline. Figures of commodity volume of sales, indicate that purchases in retail and wholesale stores declined earlier than the dollar value of sales. The commodity volume of wholesale and retail sales began to decline about the same time that the physical volume of production of textiles, shoes and furnishings did. The commodity volume of combined wholesalers, as well as wholesaler grocers, and dry-goods stores began to decline in January 1920; retail and wholesale shoe chains in February 1920.¹ Furthermore production of automobiles and other luxury goods declined in activity at the same time. Stocks in retail and wholesale stores were increasing throughout this period. We have also seen that at the very source of income a discrepancy arose, namely, that the rate of disbursement by factory establishments did not keep pace with the rate of the pecuniary volume of output. The real income of all recipients of incomes was declining as prices were rising. This was particularly true of the salaried employees who form about one-third of all employees in the United States. Are all these facts not evidence that there was a lag between incomes and the output of merchandise?

¹ See S. S. Kuznets, *Cyclical Fluctuations*, chaps. i and ii.

What is the significance of these facts? In the first place, evidence that there was a slackening of retail sales at this period indicates that there was a check in spending. But this does not mean that there was a prior check in the disbursement of money incomes (strictly speaking, it should be said that these figures indicate that there was a check of spending in retail stores, although at the same time there may have been a release of buying power in other directions, such as a larger proportion of income spent for rent, automobiles education and traveling). Why should we expect the rate of purchases in retail shops to decline sooner than the rate of incomes? In his reaction to increased prices, the consumer behaves somewhat differently from the merchant. In the case of the former there is a greater resistance to a change from the customary or "normal" price for articles of wear and furnishings than is true of the latter who is more dominated by business principles, of purchase and sale. A marked rise of price will induce the consumer to postpone the purchase of a given commodity, but as long as profits are in sight, this will not be the case with the business man. The latter may have curtailed his orders for future delivery even though his immediate purchases may not decline. In addition, the reaction to the high cost of living was reinforced by the fact that the things the consumer denied himself because of the requirements of the war, were largely replenished by this time.

If we do not accept the above facts as proof of the statement that a decrease in spending was not necessarily due to a check of the rise in incomes, we are confronted with a further difficulty. We will have to explain how the discrepancy which has been shown to exist between the wages of factory workers and the value of the products turned out, was ironed out if at all. Was the lag which existed between wages and output of factory labor counterbalanced by the possibility that other groups of wage earners' incomes rose relatively more

than did those of factory labor? Or did the goods flow in lesser volume as they passed through the distributive trades while the incomes of those handling these goods showed a proportionate increase?

It is very unlikely that the incomes of employees handling these goods on their way to the consumer increased proportionately more than the receipts of factory labor. The increase in the wages of railroad workers may have been commensurate with that of payrolls in manufacturing establishments, but the incomes of the employees in the distributive trades did not rise nearly as much. At any given time the ratio of the disbursement of incomes decreases as the goods pass from the factory to the retailer. This was particularly true at the time in question.

Let us take it for granted that the lag between wages and value of output of factory labor was not ironed out by relative increases in the incomes of other employees. Then what should have followed is an increase of stocks of goods in the different stages of the business structure. Such an increase occurred. To examine its significance we must recall what the main issue is, namely, the importance of the lag of consumers' incomes in making for those stresses and strains that start to appear towards the peak of prosperity.

We must not, however, interpret an increase in stocks as due primarily to a decline in purchasing power. A greater aggregate volume of stocks is far from being a serious matter when the volume of business continues at the increased pace already set; and if prices are expected to rise still further, then the carrying of larger stocks means enhanced profits. In other words greater accumulation of goods on the shelves of merchants is merely the speculative aspect of the rising price situation. That large stocks need not have serious consequences will be admitted as stressing the obvious. But this statement applies only to the early

stages of prosperity, when the lag between wages and output has not been sufficiently large to exert any influence because of the time interval existing between production and the delivery of goods to the consumer. But once the force of this discrepancy has begun to operate, then in so far as receipts of goods by retail stores exceeds the flow of money incomes back to the distributive channels, the whole structure starts on its downward course.

It is undoubtedly true, that one of the concomitants of a turn of business away from prosperity is the appearance of large quantities of goods ready for sale; but to point to this great abundance of stocks as a sure indication of inadequacy of purchasing power is to beg the question. What we want to know is, why are these very stocks not thought to be a serious matter at one time and why do they appear menacing at another time?

Furthermore, that stocks would have increased in the prosperous phase of the first cycle even if the amount of wages rose proportionately to the pecuniary volume of production, was to be expected in view of the speculative fever which had developed all along the line from retailer to manufacturer, a spirit which was reinforced by the difficulty of getting immediate shipments with the consequence that orders were duplicated. Even if retail trade were not to decline, but manufacturers were to fill orders equal to the amount given them, difficulties would soon be felt not necessarily by retailers but by the very manufacturers of consumers' goods who would now feel a decline in orders for future delivery due in part to the fact that wholesalers and retailers had overestimated the rate of increase of purchases on the part of consumers. The curtailment of output and expansion would soon be felt by manufacturers of equipment. Accumulating stocks then were undoubtedly one of the strains that appeared in prosperity, but we have indicated that their

increase was not necessarily due to the failure of industry to disburse wages in proportion to increased production. In short then, the attempt to reduce cyclical phenomena to a mechanical comparison of two flows, one of goods and one of merchandise errs on the side of neglecting the chief agents that direct the different streams, namely, the entrepreneurs who determine the amount of purchases for immediate and future delivery and the captains of industry who direct the volume of expansion of new enterprises or the contraction of established ones, and the bankers who insure the launching of them or the capacity for purchasing large quantities of materials by extension of credit, and finally the consumers who direct a varying flow of purchasing power into the field of the distributive trades.

Let us resume the description of the course of the two cycles in the light of the changes in the flow of consumers' incomes. With textiles, automobiles, and building declining in the first quarter of 1920, a spirit of greater caution and uncertainty developed; a darker mood prevailed in the second quarter with widespread cancellations. By the end of the third quarter, the payrolls in the metal industries, railroads and mines, reached their peak and began to decline. The same was true of the incomes of farm labor as well as the more important group, the farmers, the prices of whose products began to drop sharply, because of decline in export demand and the disruption of the exchanges, not to mention other factors.

While other industries were continuing on their downward course, the output of manufacturing establishments supplying consumers' goods reached bottom in the first quarter of 1921 and began to move upwards, although the output began to decline again towards the end of the year. The restraints upon purchases by consumers in the previous year were now loosened by the desire to take advantage of low prices. And

so retail and wholesale trade started to increase although they too commenced to sag downwards again towards the end of the year. This gave the distributive trades an opportunity to release a large part of their stocks. But where did the purchasing power come from to sustain this increase? It must be remembered that a large number of the recipients of incomes did not experience a reduction of receipts during this time. Incomes in the form of interest, dividends and rents did not decline. And although profits may vary considerably, the amount which the owner of a business withdraws for the use of his family fluctuates within narrow limits, this being particularly true of that proportion of expenditure going into retail trade. The incomes of salaried classes did not fall as much as the incomes of wage earners. Then too those engaged in public and professional service experienced little reduction in their incomes. And finally, the *real* incomes of all of these groups experienced an increase.

The building industry, taking advantage of the low prices of raw materials and labor and rates of money, began to resume activity in the early part of 1921. This stimulated the industries supplying building materials and in the latter half of the year, iron and steel began on an upward course. Mining and transportation followed. With the exceptions of the textile, bituminous coal and the railroad shopmen's strikes, industry manifested a slow but gradual upward movement of activity throughout 1922. This disbursed fresh sources of purchasing power, which if we are to judge by the dollar volume of retail sales began to assert itself in the second half of 1922. By the spring of 1923 a high degree of activity prevailed, and a spirit of buoyancy which was reminiscent of the peak of prosperity of 1920 began to appear in many quarters. The Harvard index of the production of basic commodities exceeded the index of production of consumers' goods to a greater extent than ap-

peared at the peak of the first cycle. At about the same time, dollar volume of retail and wholesale trade began to decline. So far as can be ascertained, the same was true of the physical volume of wholesale and retail trade.

In this cycle the disbursement of wages did not fall behind output. In most of the indices of payrolls and pecuniary volume of production, we do not find a declining ratio of the former to the latter; nor does a comparison between the series of physical volume of production and purchasing power indices show any different result. Payrolls and purchasing power kept on increasing while production, wholesale and retail trade were declining. Apparently then, we cannot look in the direction of inadequate purchasing power to explain the recession in business activity in 1923.

The speculative tendencies that developed in certain markets in the spring of 1923 were held in check by a number of circumstances. Many business leaders and bankers as well as prominent government officials raised timely notes of warning against the trend of large-scale forward buying. They were reinforced by the policy of the Federal Reserve Banks of tightening credit when signs of excessive expansion appeared. All these were influences which operated primarily because the business community still had vivid remembrances of the deflationary consequences of the speculative developments of 1920. And so we find that in the second quarter of 1923 extreme caution in making commitments had developed among business men. From that time on most industries began a movement downward which terminated in most cases in July 1924.

We need not go further. Suffice it to say, there were many more factors that brought about the business fluctuations after the war other than the inadequacies of consumers' incomes. In all likelihood, we must relegate this factor to a role of secondary importance as a causal element in the two post-war business cycles.

Finally, we should recall the words of caution that were expressed at the beginning of this study. It is dangerous to base a theory of business cycles upon any two cases and particularly dangerous to base a theory upon two cycles of such peculiar character as those of 1919-24 in the United States.

VITA

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